RUBY-9911VG2A

ATX Mainboard

User's Manual

Version 1.2a

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Appendix A

Appendix B

How to Use This Manual

The manual describes how to configure your RUBY-9911VG2A system board to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1: System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2: Hardware Configuration. Show the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3: System Installation. Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4: BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5: Troubleshooting. Provide variously of useful tips to quickly get RUBY-9911VG2A running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. The vendor may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.portwell.com.tw/.

Chapter 1
System Overview

1.1 Introduction

Taking advantages of Intel energy-efficient dual-core processing, RUBY-9911VG2A ATX Mother Board adopts Intel® Core™ 2 Quad, Core™ 2 Duo Desktop processors up to 1333 MHz FSB and Intel® Q45 Express chipset with Intel® ICH10DO RAID function to fit the high performance computer system applications for meeting today's demanding pace and keep complete compatibility with hardware and software designed. The onboard devices support one PCI Express x16 for an alternative graphics add-on card, one PCI Express x4, four PCI slots, integrated graphics, and built Intel® 82567LM Gigabit Ethernet PHY for iAMT 5.0 function & Intel® 82574L Gigabit Ethernet controller offering stable high-speed networking.

RUBY-9911VG2A comes with the Intel® GMA 4500 graphics supporting DVMT 5.0 display memory up to 287 MB. The board also features two DIMMs up to 4 GB SDRAM with dual channel DDR3 1066/800, enhanced onboard one SATA to Parallel ATA IDE interface supporting Ultra ATA 33/66/100 synchronous mode feature, four Serial ATA high-speed data transferring at up to 3 Gb/s, optional Intel® Trusted Platform Module 1.2, and 7.1 + 2 CH HDAC through Realtek ALC883 audio codec. The onboard Winbond W83627 UHG I/O Controller supports four serial ports: two RS-232 serial port interfaces, one RS-232 and one RS-232/422/485 pin headers, Hardware Monitor function, eight hi-speed USB 2.0 ports, two 6-pin Mini-Din connectors for PS/2 mouse and keyboard, and one 24-pin standard connector designed to support ATX power function. Besides, a feature of CPU overheat protection will provide user more security and stability.

Built with these impressed functions, RUBY-9911VG2A ATX Mother Board are those ideal solutions for Automation, multi-media, gaming, DVR, KIOSK, medical equipment, industrial automation, financial automation, process control, semiconductor equipment, and network security markets.

Note:
PCI Express x16 slot (PCIE1) only support VGA card.

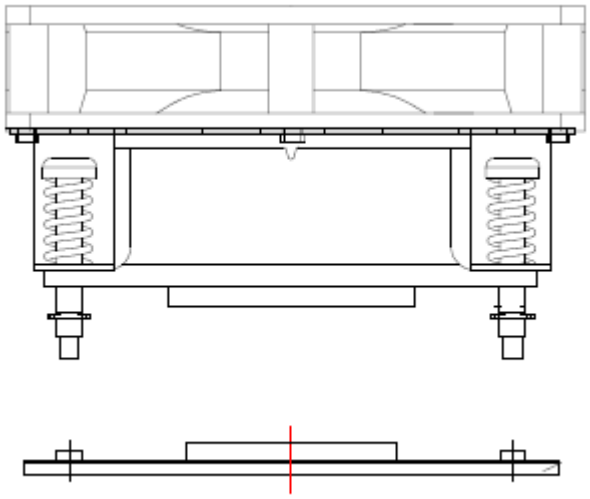
1.2 Check List

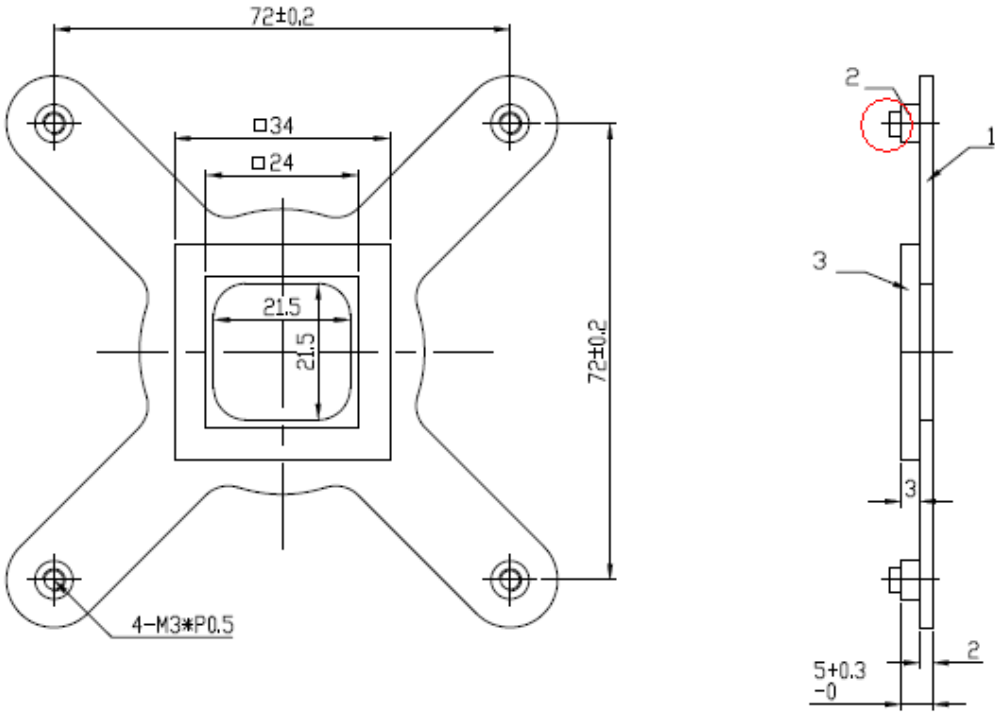
The RUBY-9911VG2A package should cover the following basic items:

- ✓ One RUBY-9911VG2A ATX main board
- ✓ One 40-pin IDE cable
- ✓ One 34-pin FDD cable
- ✓ Two Serial ATA cable
- ✓ One USB cable
- ✓ One Serial port for RS232 cable
- ✓ One Serial port for RS232/RS422/RS485 cable (jumper select)
- ✓ One I/O Shield cover
- ✓ One Supporting CD Driver contains internal VGA display driver, Ethernet network controller driver and on board devices drivers
- ✓ One Cooler Back Plate

You may just choose Portwell's cooler kit, or please do use Portwell's cooler back plate under the board.

Note:
If you'd like to use your own cooler, instead of Portwell's, please make sure the below SPEC can match the cooler back plate we shipped with the board.
Choosing cooler:
1. Please use screw-type cooler. (Push-pin type cooler is not recommended)
2. The screw of the screw-type Cooler must be M3.
3. The pillar height of your choosing cooler's back plate in the PCB holes must be 2mm±0.2mm, then you can make sure this cooler can be used on Portwell's cooler back plate.





If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

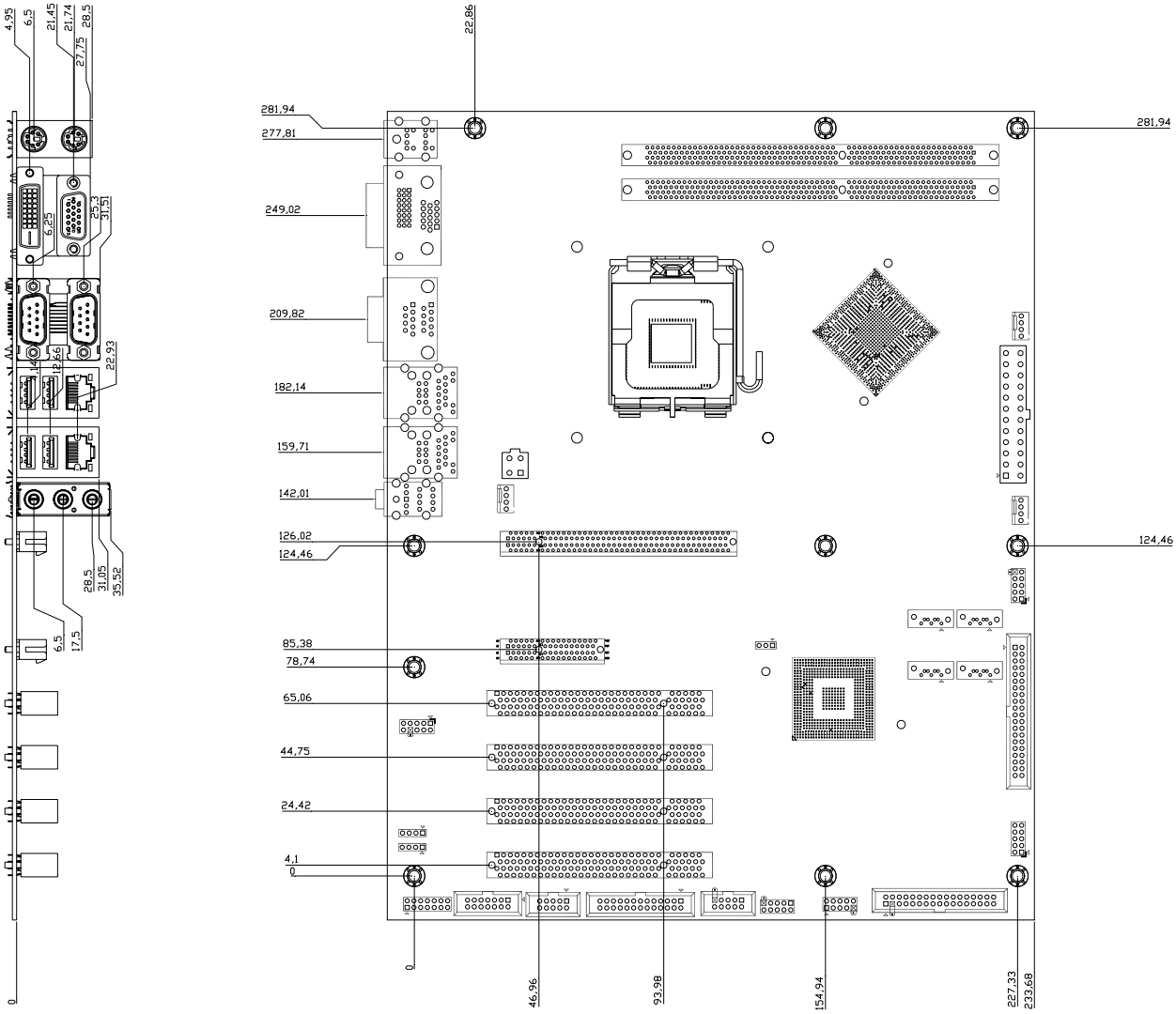
- **Main processor**
  - Support Intel® Core™ 2 Quad / Duo Processor
  - FSB: 1333/1066/800 MHz
- **BIOS**
  AMI BIOS
- **Main Memory**
  - Support dual-channel DDR3 memory interface
  - Up to 4GB DDR3 800/1066 SDRAM on four 240pin DIMM sockets
- **Chipset**
  INTEL Q45 and ICH10DO
- **Expansion Interface**
  - One PCI Express X 16 slot
  - One PCI Express X 4 slot
  - Four 32-bit PCI expansion slots
- **IDE Interface**
  One SATA to Parallel ATA IDE interface supporting Ultra ATA 33/66/100 synchronous mode feature

- **SATA Interface**
  Four SATA connectors, data transfer rates up to 3.0Gb/s
- **Serial Ports**
  Support four serial ports (Two RS-232 ports with 5V/12V at real I/O, One RS232 port and one RS-232/422/485 selectable pin headers)
- **Parallel Port**
  Support one parallel pin header
- **FDD Port**
  Support one FDD pin header
- **USB Interface**
  Support eight USB (Universal Serial Bus) ports (four at rear I/O; four ports internal)
- **PS/2 Mouse and Keyboard Interface**
  Support dual 6-pin mini-DIN connector at rear I/O panel for PS/2 keyboard/mouse
- **Audio Interface**
  Connector and header of Line-in/Line-out/MIC for external and internal usage
- **Real-Time Clock/Calendar (RTC)**
  - Build-in ICH10DO
  - Y2K compliant
- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset
- **On-board VGA**
  Integrated Intel® Gen 5.0 GMA 4500 Graphics
- **On-board Ethernet LAN**
  Two Gigabit Ethernet (10/100/1000 M bits/sec) LAN port
- **High Driving GPIO**
  Programmable 8-bit Digital I/O interface
- **System Monitoring Feature**
  Monitor CPU temperature, system temperature and major power sources, etc
- **Outline Dimension (L X W)**
  305mm (12") X 244mm (9.6")
- **Power Requirements**

Voltage Value(V)	3.30		5.00		12.00		12.00		5.00	
Power Rail	P3V3_MAIN		P5V_MAIN		P12V_MAIN		P12V_CPU		P5V_STBY	
	Imax	I-nom	Imax	I-nom	Imax	I-nom	Imax	I-nom	Imax	I-nom
Input current(A)	31.73	16.51	20.71	10.72	6.95	3.68	11.57	9.25	1.81	1.03

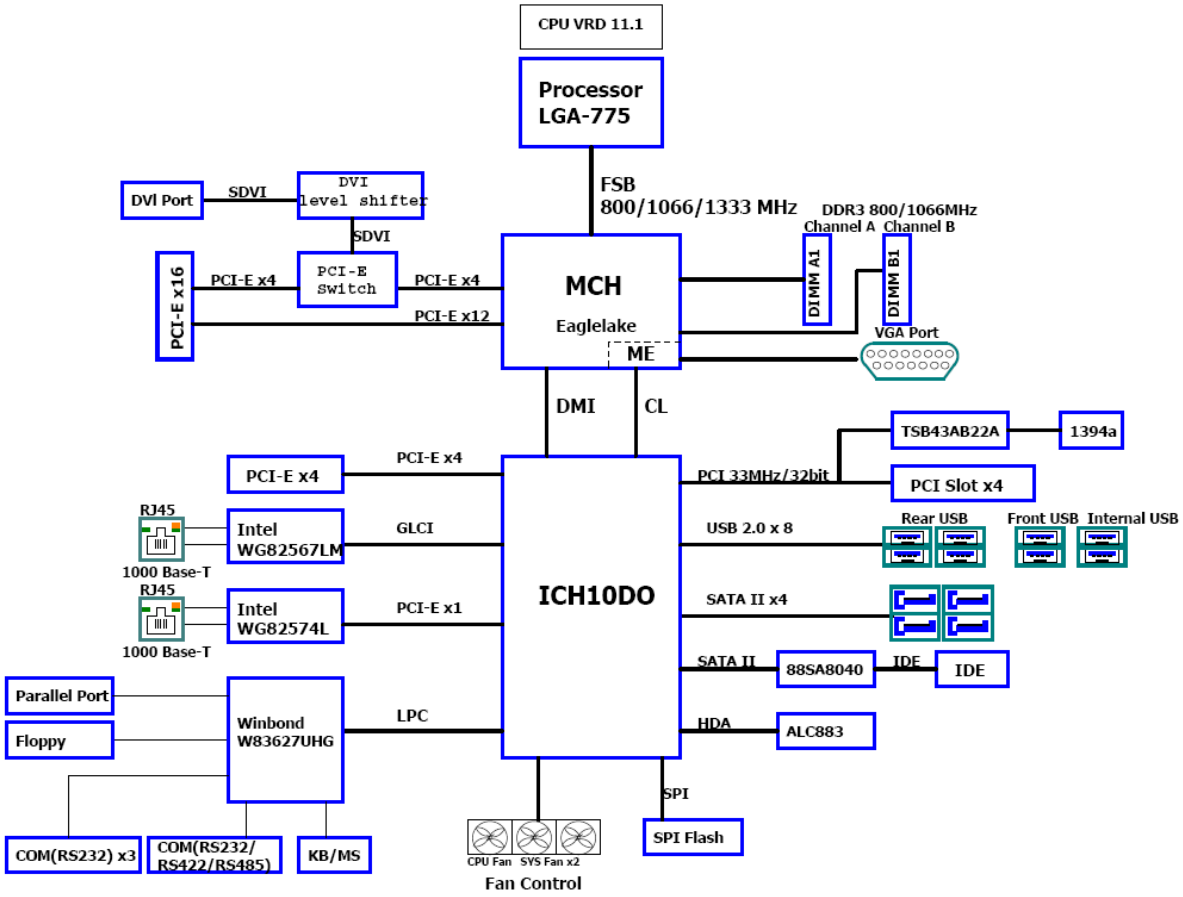
- **Operating Temperature**
  0°C ~ 60°C
- **Storage Temperature**
  -20°C ~ 80°C
- **Relative Humidity**
  5% ~ 90%, non-condensing

1.3.1 Mechanical Drawing



1.4 System Architecture

All of details operating relations are shown in RUBY-9911VG2A System Block Diagram.



RUBY-9911VG2A Block Diagram

Chapter 2
Hardware Configuration

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on the board are in the proper position. The default settings shipped from factory are marked with an asterisk (★).

2.1 Jumper Setting

In general, jumpers on the board are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (SHORT) or remove (NC) it from the jumper pins according to the following instructions. Here, NC stands for "Not Connect".

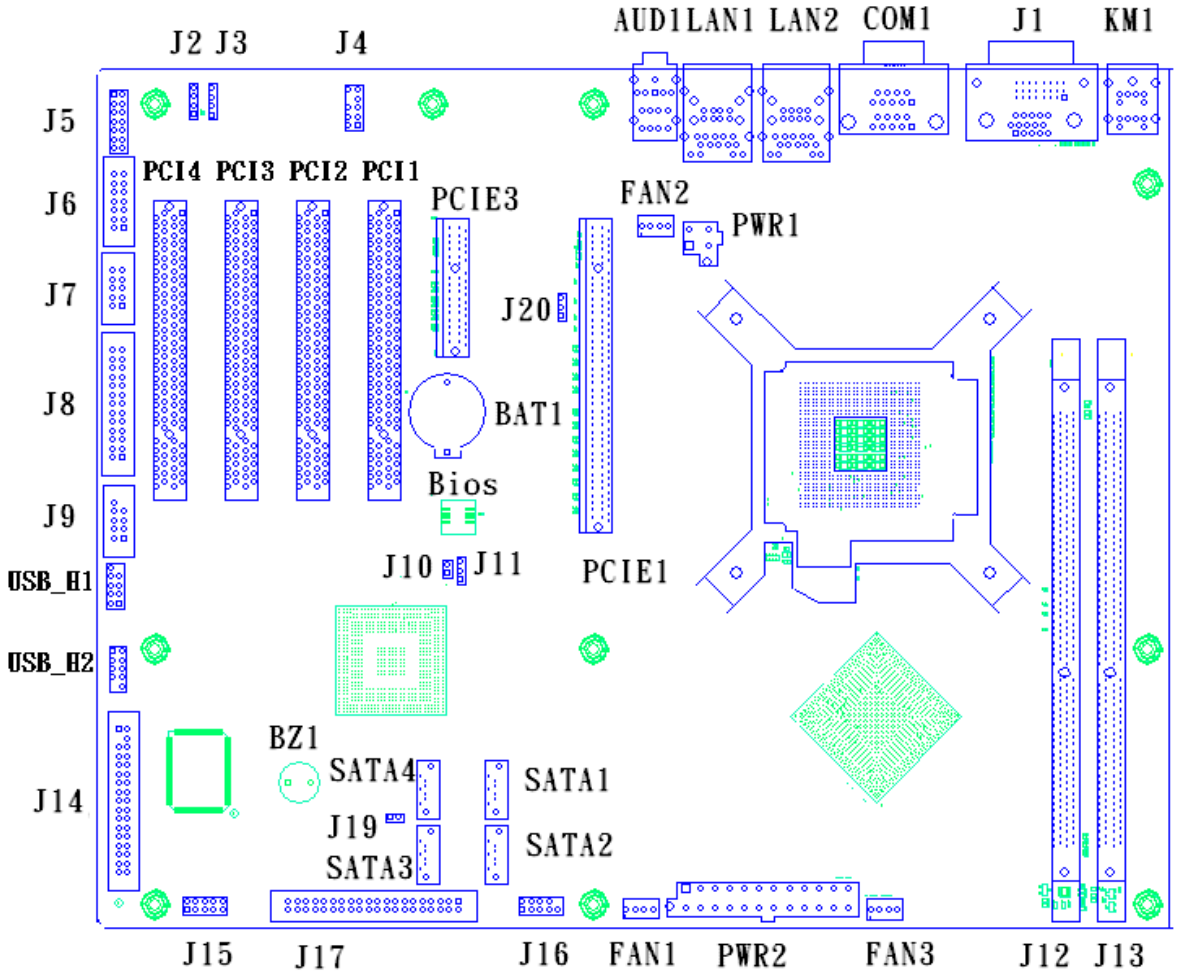


Figure 2-1 RUBY-9911VG2A Jumper & Connector Location

J5 : COM4 RS-232/422/485 Select

PIN No.	RS-232 ★	RS-422	RS-485
1-2	OFF	ON	ON
3-4	OFF	ON	ON
5-6	OFF	OFF	ON
7-8	OFF	ON	OFF
9-10	OFF	ON	ON
11-12	ON	OFF	OFF
13-14	OFF	OFF	ON

J11 :Clear CMOS

PIN No.	Description
1-2	Clear CMOS
2-3	Normal operation★

J20 : PCIE x16 Slot Function Select

PIN No.	Description
1-2	Concurrent ADD2 & on board DVI Enable★
2-3	PCIE x1,x4 VGA Card Enable

J19 : IDE function enable or disable Select:

PIN No.	Description
1-2 (open)	IDE function Enable★
1-2 (short)	IDE function disable

Note:
If only use SATA device, it needs to disable IDE function. If it doesn't disable IDE function, the HDD LED function maybe error.

2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors on this Industrial Mainboard.

Connector Function List

Connector	Description	Remark
AUD1	Audio port	
COM1	Dual COM connector (COM1, COM2)	
FAN1, 2, 3	Fan connector	1 x 4 header
J1A	VGA connector	
J1B	DVI connector	
J2	SPDIF header	1 x 4 header
J3	CD-IN header	1 x 4 header
J4	Front Audio Header	2 x 5 wafer
J6	COM4 Header	2 x 7 wafer
J7	COM3 Header	2 x 5 wafer
J8	Parallel Port	2 x 13 header
J9	1394 Header	2 x 5 header
J10	Chassis Intruder Header	1 x 2 header
J12, 13	Memory socket	
J14	Floppy box header	2 x 17 wafer
J15	Digital I/O header	2 x 5 header
J16	Front panel header	2 x 5 header
J17	IDE connector	2 x 20 header
KM1	Keyboard & Mouse port	
LAN1	LAN1& USB Connector	
LAN2	LAN2 & USB Connector	
PWR1	Auxiliary CPU Power connector	2 x 2 wafer
PWR2	Main Power connector	2 x 12 wafer
SATA1, 2, 3, 4	SATA connectors	
USB_H1 USB_H2	USB connector	2 x 5 header

Pin Assignments of Connectors

AUD1 : Audio Connector

PIN No.	Signal Description
1 (Blue)	Line-in
2 (Green)	Line-out
3 (Red)	MIC-in

FAN 1, 2, 3

PIN No.	Signal Description
1	Ground
2	12V
3	Fan Speed Control
4	FANCTL

J2 : SPDIF Header

PIN No.	Signal Description	PIN No.	Signal Description
1	A_SPDIF_OUT1	2	5V
3	NC	4	GND

J3 : CD_IN Header

PIN No.	Signal Description	PIN No.	Signal Description
1	CD_IN_L	2	CD_GND
3	CD_GND	4	CD_IN_R

J4 : Front Audio Header

PIN No.	Signal Description	PIN No.	Signal Description
1	A_ MIC2_L	2	GND
3	A_MIC2_R	4	FP_AUD_DETECT
5	A_LINE2_R	6	A_MIC2_JD
7	GND	8	NC
9	A_LINE2_L	10	A_LINE2_JD

J5 : COM4 RS232/422/485 Select Header

PIN No.	Signal Description	PIN No.	Signal Description
1	COM4_TX_P	2	COM4_TX_#
3	COM4_RX_P	4	COM4_RX_#
5	491RED	6	491DED
7	491RED	8	GND
9	COMD_RXD	10	SIN422D★
11	COMD_RXD	12	SIN232D★
13	SEL_411_485#	14	GND

J6 :COM4 Serial Header

PIN No.	Signal Description	PIN No.	Signal Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND
11	TXD+	12	TXD-
13	RXD+	14	RXD-

J7 : COM3 Serial Header

PIN No.	Signal Description	PIN No.	Signal Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	NC

J8 : Parallel Header

PIN No.	Signal Description	PIN No.	Signal Description
1	STROKE	2	AFD1#
3	P_D0	4	EPR#
5	P_D1	6	INIT1#
7	P_D2	8	SLIN1#
9	P_D3	10	GND
11	P_D4	12	GND
13	P_D5	14	GND
15	P_D6	16	GND
17	P_D7	18	GND

19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

J9 : 1394 Header

PIN No.	Signal Description	PIN No.	Signal Description
1	TA 0+	6	TB 0-
2	TA 0-	7	1394_COM_PWR_FRONT
3	GND	8	1394_COM_PWR_FRONT
4	GND	9	KEY
5	TB0+	10	GND

J10 : Chassis Intruder Header

PIN No.	Description
1	Intruder detect
2	GND

J15 : Digital Header

PIN No.	Signal Description	PIN No.	Signal Description
1	VCC5	2	DI0
3	DO0	4	DI1
5	DO1	6	DI2
7	DO2	8	DI3
9	DO3	10	GND

J16 : Front Panel Header

PIN No.	Signal Description	PIN No.	Signal Description
1	5V	2	PWR_LED
3	HDD_LED	4	GND
5	GND	6	PWR_SW
7	RST_SW	8	GND
9	NC	10	Key

J17 : IDE Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Reset IDE#	2	GND
3	PDD 7	4	PDD 8
5	PDD 6	6	PDD 9
7	PDD 5	8	PDD 10
9	PDD 4	10	PDD 11
11	PDD 3	12	PDD 12
13	PDD 2	14	PDD 13
15	PDD 1	16	PDD 14
17	PDD 0	18	PDD 15
19	GND	20	5V
21	PDDREQ	22	GND
23	PDIOW#	24	GND
25	PDIOR#	26	GND
27	PIORDY	28	GND
29	PDDACK#	30	GND
31	IRQ	32	IOCS16
33	PDA1	34	P66DET
35	PDA 0	36	PD_A2
37	PDC#1	38	PDCS_1J
39	PATALED#	40	GND

PWR1 : Auxiliary CPU Power Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	3	12V_VRD
2	GND	4	12V_VRD

PWR2 : Main Power Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	5V	16	PS_ON_N
5	GND	17	GND
6	5V	18	GND
7	GND	19	GND
8	ATXPWRGD	20	Reserved
9	5V_STBY	21	5V
10	12V	22	5V

11	12V	23	5V
12	3.3V	24	GND

USB_H1(H2) : USB Header

PIN No.	Signal Description	PIN No.	Signal Description
1	5V_USB	2	5V_USB
3	USB4N	4	USB5N
5	USB4P	6	USB5P
7	GND	8	GND
9	KEY	10	GND

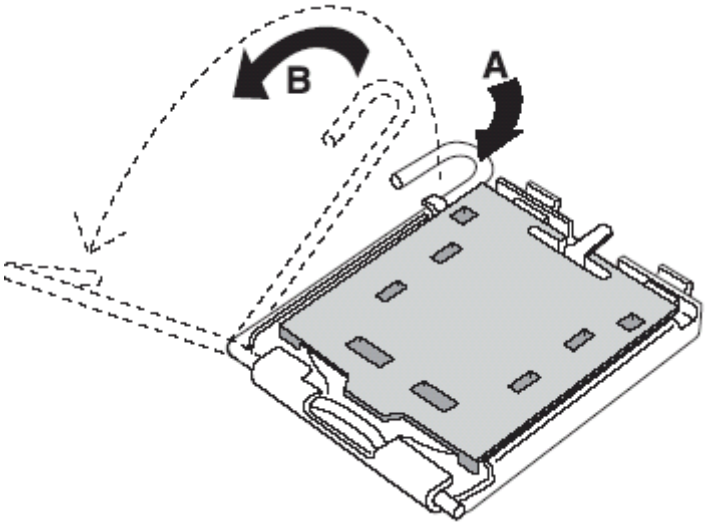
Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle Watch Dog Timer (WDT) and operation of GPIO in software programming.

3.1 Intel® LGA 775 Processor

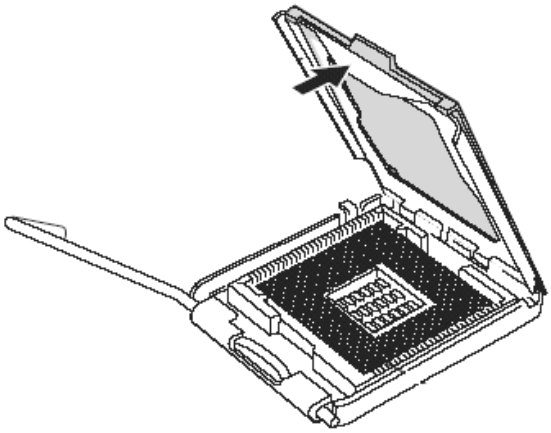
Installing LGA 775 CPU

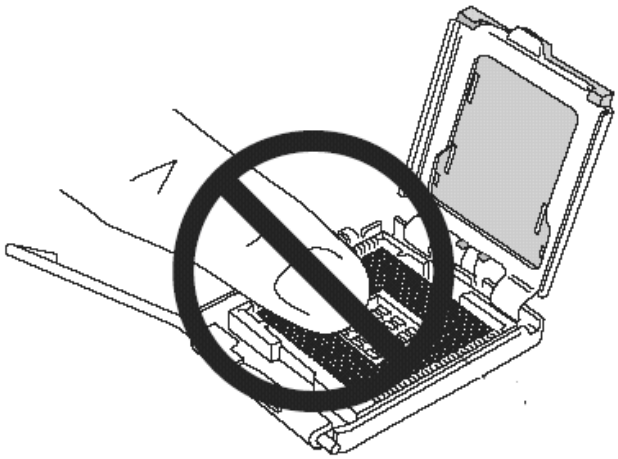
1) Lift the handling lever of CPU socket outwards and upwards to the other end.



2) Align the processor pins with pinholes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place . If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

Triangle mark is meaning first pin position; kindly assemble and take aim at notch of top and bottom between CPU and socket.





Note:
Don't touch directly by your hand or impacts internal align balls of CPU socket to avoid motherboard destruction, it is a precise actuator.

3) Push down the lever to lock processor chip into the socket once CPU fits.

4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the LGA 775 socket.

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus

RUBY-9911VG2A will automatically detect the CPU FSB 800/1066/1333 MHz used. CPU speed of Intel Core 2 Duo and Intel Core 2 Quad Processor can be detected automatically.

3.2 Main Memory

RUBY-9911VG2A provide 2 x 240-pin DIMM sockets which supports 800/1066 DDR3 SDRAM as main memory, Non-ECC (Error Checking and Correcting), non-register functions. The maximum memory size can be up to 4GB capacity.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be either one double-sided DIMM in either one DIMM socket or two single-sided DIMM in both sockets.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Dual Channel DDR3 DIMM

Dual Channel DDR3 memory technology doubles the bandwidth of memory bus. Adequate or higher bandwidth of memory than processor would increase system performance. To enable Dual Channel DDR3 memory technology, you have to install dual identical memory modules in both memory sockets. Following tables show bandwidth information of different processor and memory configurations.

CPU FSB	Bandwidth
1066MHz	8.5GB/s
800MHz	6.4GB/s

Memory Frequency	Dual Channel DDR Bandwidth	Single Channel DDR Bandwidth
1066MHz	17GB/s	8.5GB/s
800MHz	12.8GB/s	6.4GB/s

Note:
To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade system performance without acquiring technical information.

3.3 Installing the Single Board Computer

To install your RUBY-9911VG2A into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place RUBY-9911VG2A into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that SBC is properly inserted and fixed by mechanism.

Note:
Please refer to section 3.3.1 to 3.3.7 to install INF/VGA/LAN/Audio/Raid/AMT & TPM drivers.

3.3.1 Chipset Component Driver

The chipset on RUBY-9911VG2A is a new chipset that a few old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows XP, please install its INF before any of other Drivers are installed. You can select the Intel Chipset driver from the RUBY-9911VG2A CD-title.

3.3.2 Intel Integrated Graphics GMCH Chip

RUBY-9911VG2A comes with the Intel® GMA 4500 graphics supporting DVMT 5.0 display memory up to 287 MB. Shared 32 accompany it to 128MB system Memory with Total Graphics Memory. This combination makes RUBY-9911VG2A an excellent piece of multimedia hardware.

With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI-Express by 16 VGA card can take over the system display.

Drivers Support

Please select Intel Graphic driver from the RUBY-9911VG2A Driver CD-title. Driver supports Windows XP.

3.3.3 On-board Fast Ethernet Controllers

Drivers Support

Please select Intel Ethernet driver from the RUBY-9911VG2A Driver CD-title to install those two integrated Intel® 82567LM Gigabit Ethernet PHY for iAMT 5.0 function & Intel® 82574L Gigabit Ethernet controller drivers. Those two drivers support Windows XP.

LED Indicator (for LAN status)

This provides two LED indicators to report Intel 82567LM & 82574L Gigabit Ethernet interface status. Please refer to the table below as a quick reference guide.

<table>
<tr><th rowspan="2">82567LM &82574L</th><th rowspan="2">Color</th><th rowspan="2">Name of LED</th><th colspan="3">Operation of Ethernet Port</th></tr>
<tr><th colspan="2">Linked</th><th>Active</th></tr>
<tr><td>Status LED</td><td>Orange</td><td>LAN Linked & Active LED</td><td colspan="2">On</td><td>Blinking</td></tr>
<tr><td rowspan="2">Speed LED</td><td>Orange</td><td rowspan="2">LAN speed LED</td><td>Giga Mbps</td><td>100 Mbps</td><td>10 Mbps</td></tr>
<tr><td>Green</td><td>Orange</td><td>Green</td><td>Off</td></tr>
</table>

3.3.4 On-board High Definition Audio Controller

Drivers Support

Please select the Realtek High Definition Codec Audio driver form RUBY-9911VG2A Driver CD-title. The driver supports Windows XP.

3.3.5 Intel Matrix Storage Manager Device

Drivers Support

Please find utility tool for Intel ICH10DO of RUBY-9911VG2A CD-title. The drivers support Windows XP.

Installing Serial ATA hard disks

The RUBY-9911VG2A supports Four Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:
1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

Intel RAID configurations

This RUBY-9911VG2A supports RAID 0, RAID 1, RAID 5, RAID (1+0) and Intel® Matrix Storage configurations for Serial ATA hard disks drives through the Intel ICH10DO Southbridge chip.

RAID configurations

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

Intel Matrix Storage Manager. The Intel® Matrix Storage technology supported by the ICH10DO chip allows you to create a RAID 0 and a RAID 1 set using only two identical hard disk drives. The Intel® Matrix Storage technology creates two partitions on each hard disk drive to create a virtual RAID 0 and RAID 1 sets. This technology also allows you to change the hard disk drive partition size without losing any data.

3.3.6 AMT Function Installation

A major barrier to greater IT efficiency has been removed by Intel® Active Management Technology (Intel® AMT) a feature on Intel® vPro™ technology. Using built-in platform capabilities and popular third-party management and security applications, Intel AMT allows IT to better Discover, Heal, and protects their networked computing assets.

Drivers Support

Installing ME (Management Engine) Drivers (which includes HECI Driver and LMS_SOL Driver) and operating PCI serial port and PCI simple communications controller. Driver supports Windows XP.

3.3.7 Intel Trusted Platform Module

The Trusted Platform Module (TPM) can securely store keys, digital certificates, passwords and data.

Drivers Support

Please select the TPM Driver form RUBY-9911VG2A Driver CD-title. Driver supports Windows XP.

3.4 Clear CMOS Operation

The following table indicates how to enable/disable Clear CMOS Function hardware circuit by putting jumpers at proper position.

JP2 : Clear CMOS

JP2	Function
1-2	Clear CMOS
2-3	Normal operation ★

3.5 WDT Function

The Watchdog Timer of motherboard consists of 8-bit programmable time-out counter and a control and status register.

WDT Controller Register

There are two PNP I/O port addresses that can be used to configure WDT.

2Eh: EFIR (Extended Function Index Register, for identifying CR index number)
2Fh: EFDR (Extended Function Data Register, for accessing desired CR)

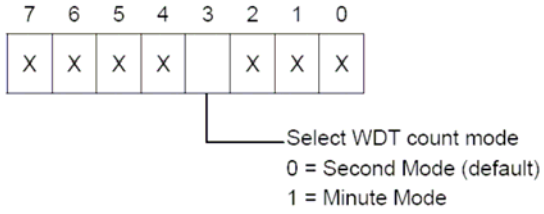
WDT Control Mode Register

Register Location: CR F5h

Attribute: Read/Write

Size: 8bit

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Attribute	Reserved	Reserved	Reserved	Reserved	R/W	Reserved	Reserved	Reserved



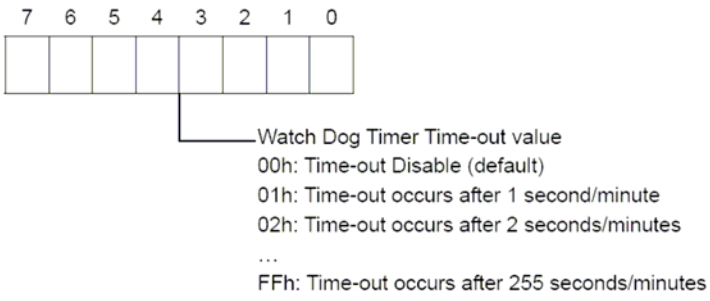
WDT Counter Register

Register Location: CR F6h

Attribute: Read / Write

Size: 8bit

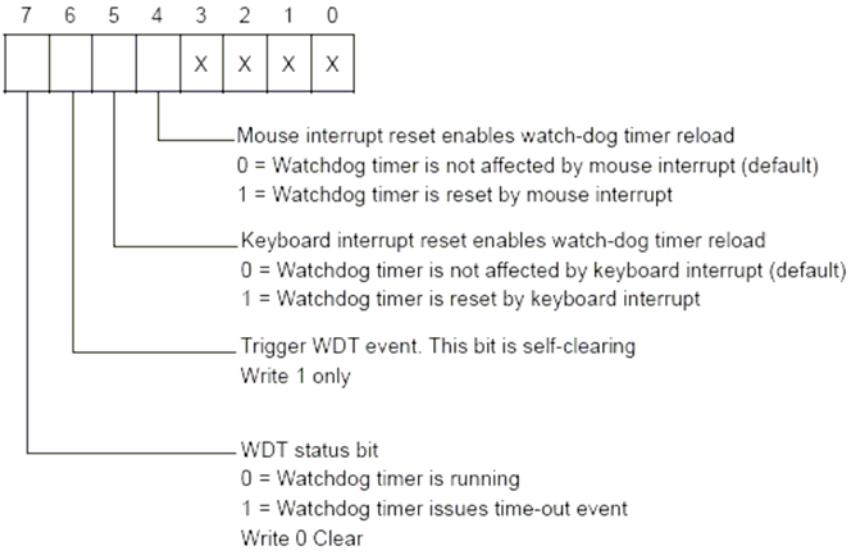
BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Attribute	Read/Write							


7 6 5 4 3 2 1 0
Watch Dog Timer Time-out value
00h: Time-out Disable (default)
01h: Time-out occurs after 1 second/minute
02h: Time-out occurs after 2 seconds/minutes
…
FFh: Time-out occurs after 255 seconds/minutes

WDT control & status Register

Register Location: CR F7h
Attribute: Read / Write
Size: 8bit

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Attribute	R/W	R/W	W 1	R/W 0	Reserved	Reserved	Reserved	Reserved


7 6 5 4 3 2 1 0
X X X X
Mouse interrupt reset enables watch-dog timer reload
0 = Watchdog timer is not affected by mouse interrupt (default)
1 = Watchdog timer is reset by mouse interrupt
Keyboard interrupt reset enables watch-dog timer reload
0 = Watchdog timer is not affected by keyboard interrupt (default)
1 = Watchdog timer is reset by keyboard interrupt
Trigger WDT event. This bit is self-clearing
Write 1 only
WDT status bit
0 = Watchdog timer is running
1 = Watchdog timer issues time-out event
Write 0 Clear

WDT Control Command Example

Use DEBUG.EXE program under DOS or Windows 98

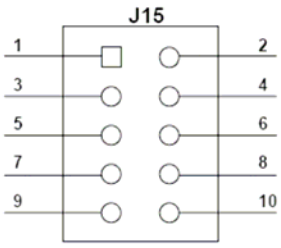
Command	WDT	Note
O 2E 87 O 2E 87		Enter Extended Function Mode
O 2E 07 O 2F 08		Select Logic Device 8
O 2E 2D O 2F 20 O 2E 30 O 2F 01		Assign WDT Enable
O 2E F6 O 2F 05	5 seconds	Specify Time-out Value
O 2E AA		Exit Extended Function Mode

3.6 GPIO

GPIO Programming Guide

The motherboard provides 4 input / output ports that can be individually configured to perform a simple basic I/O function.

GPIO Pin Assignment



Pin	Signal	default	Pin	Signal	default
1	VDD		2	DI0	low
3	DO0	high	4	DI1	low
5	DO1	high	6	DI2	low
7	DO2	high	8	DI3	low
9	DO3	high	10	VSS	

EXT_VDD: 5V ~ 12V

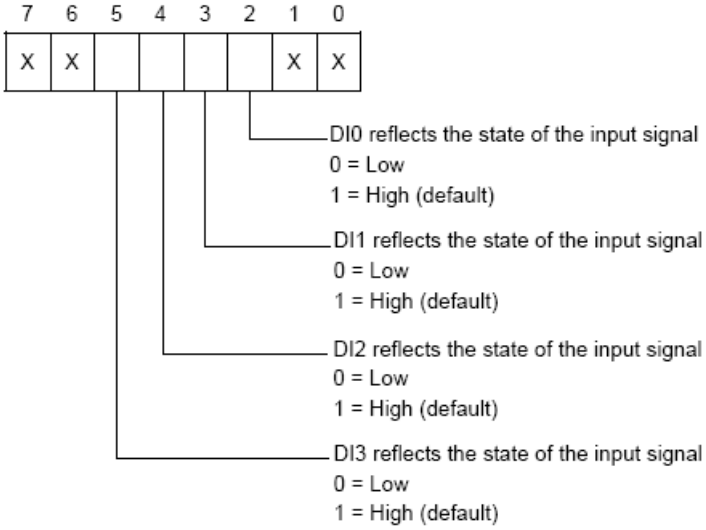
GPIO Controller Register

The control for the GPIO signals is handled through a separate 2-byte I/O space.

DI0 ~ DI3 Level for Input Register

Register Location: 4B8h
Attribute: Read
Size: 8bit

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Attribute	Reserved	Reserved	Read	Read	Read	Read	Reserved	Reserved


7 6 5 4 3 2 1 0
X X X
DI0 reflects the state of the input signal
0 = Low
1 = High (default)
DI1 reflects the state of the input signal
0 = Low
1 = High (default)
DI2 reflects the state of the input signal
0 = Low
1 = High (default)
DI3 reflects the state of the input signal
0 = Low
1 = High (default)

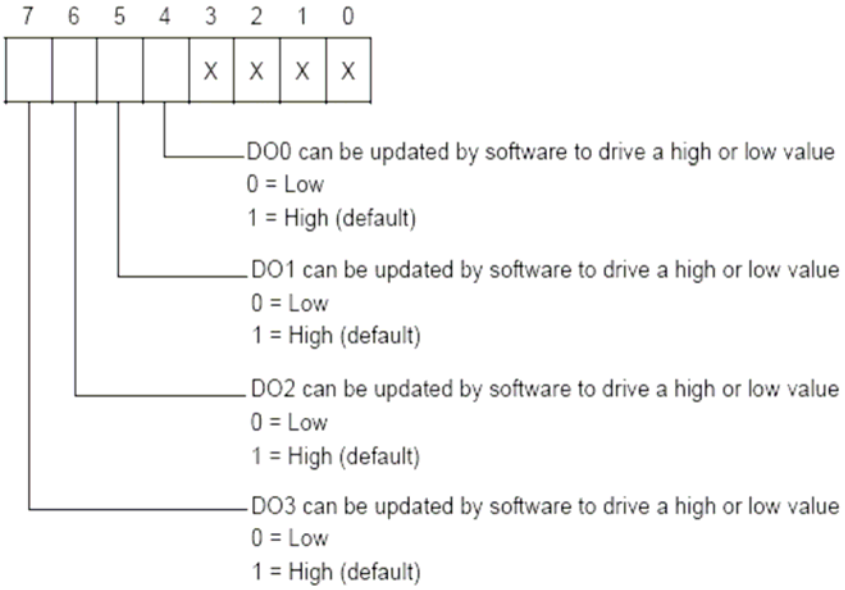
DO0 ~ DO3 Level for output Register

Register Location: 4B9h

Attribute: Read / Write

Size: 8bit

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Attribute	R/W	R/W	R/W	R/W	Reserved	Reserved	Reserved	Reserved


7 6 5 4 3 2 1 0
X X X X
DO0 can be updated by software to drive a high or low value
0 = Low
1 = High (default)
DO1 can be updated by software to drive a high or low value
0 = Low
1 = High (default)
DO2 can be updated by software to drive a high or low value
0 = Low
1 = High (default)
DO3 can be updated by software to drive a high or low value
0 = Low
1 = High (default)

GPIO Control Command Example (C Language)

Command	GPIO	Note

int iret = 0;
iret = inportb(0x486);
iret = iret | 0x01;
outportb(0x486, iret);
	Enable GPIO	bit0 = 1 for GPIO enable

iret = inportb(0x4B8);
iret = iret & 0x04;
if (iret == 0x04) {//hi}
	Check DI0 status	if bit2 = 1 then DI0 is high

iret = inportb(0x4B9);
iret = iret | 0x10;
outportb(0x4B9, iret);
	Set DO0 to high	bit4 = 1 for DO0 set to high

Chapter 4
BIOS Setup Information

RUBY-9911 is equipped with the AMI BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, RUBY-9911 communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start up

4.1 Entering Setup -- Launch System Setup

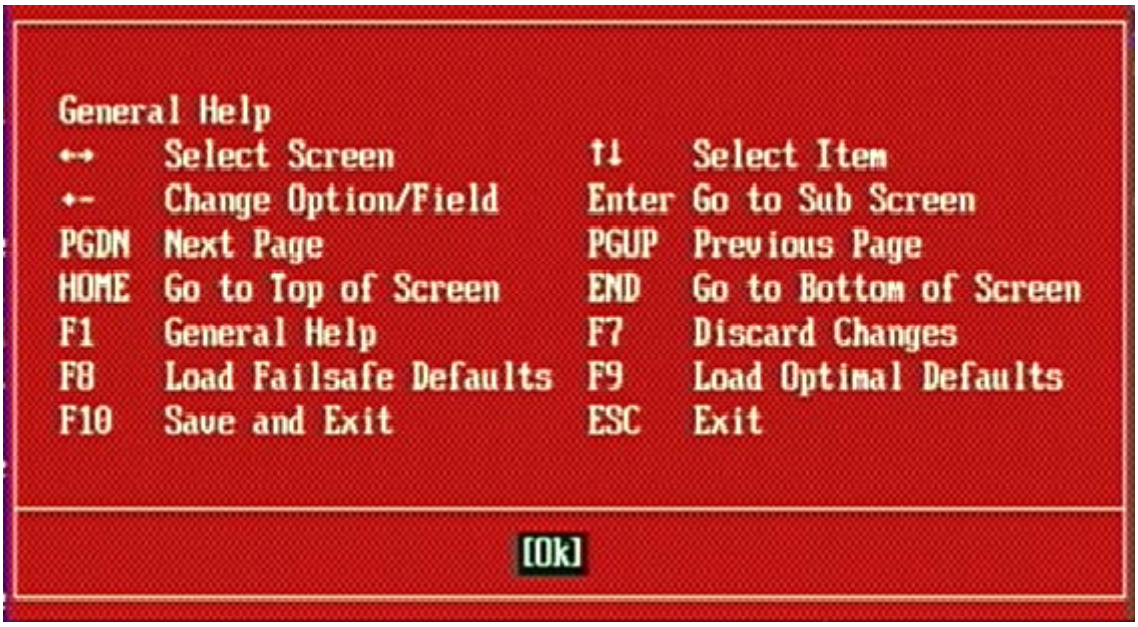
Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del> key to enter Setup.

Press <Del> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

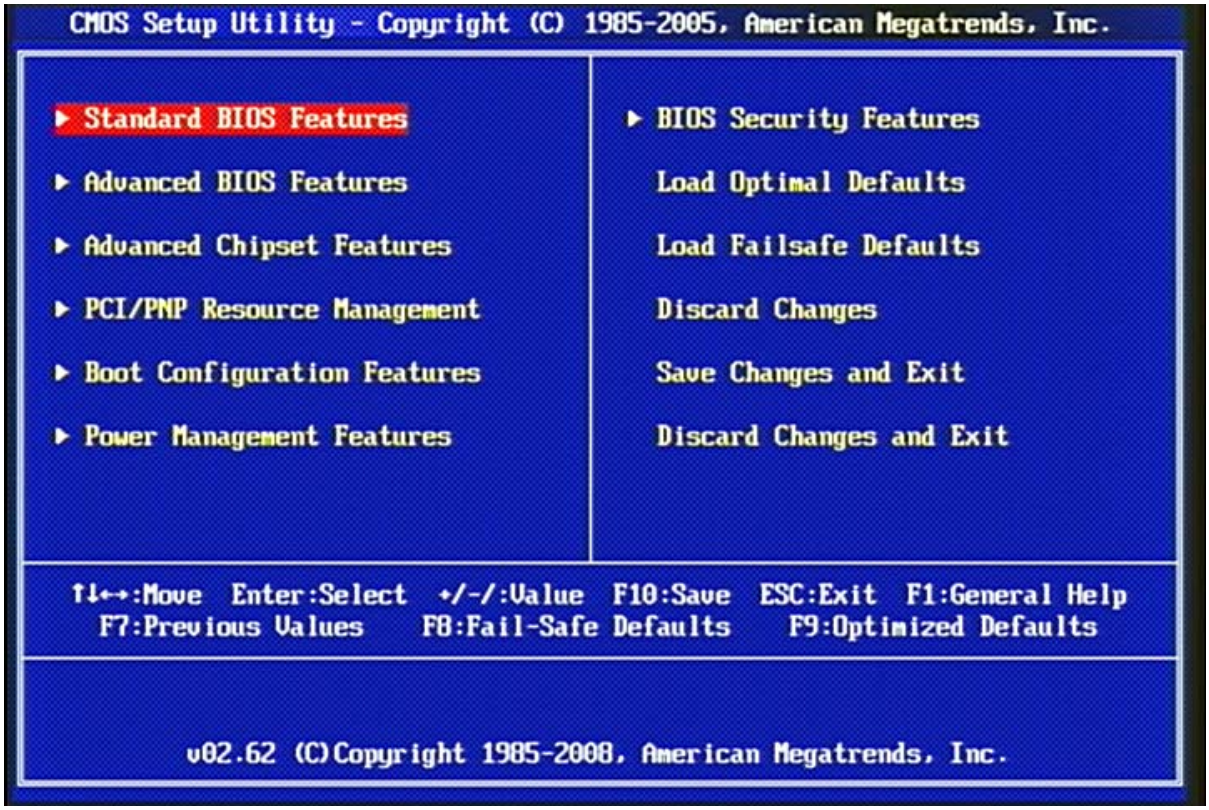
Press <F1> to Run SETUP or Resume

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.



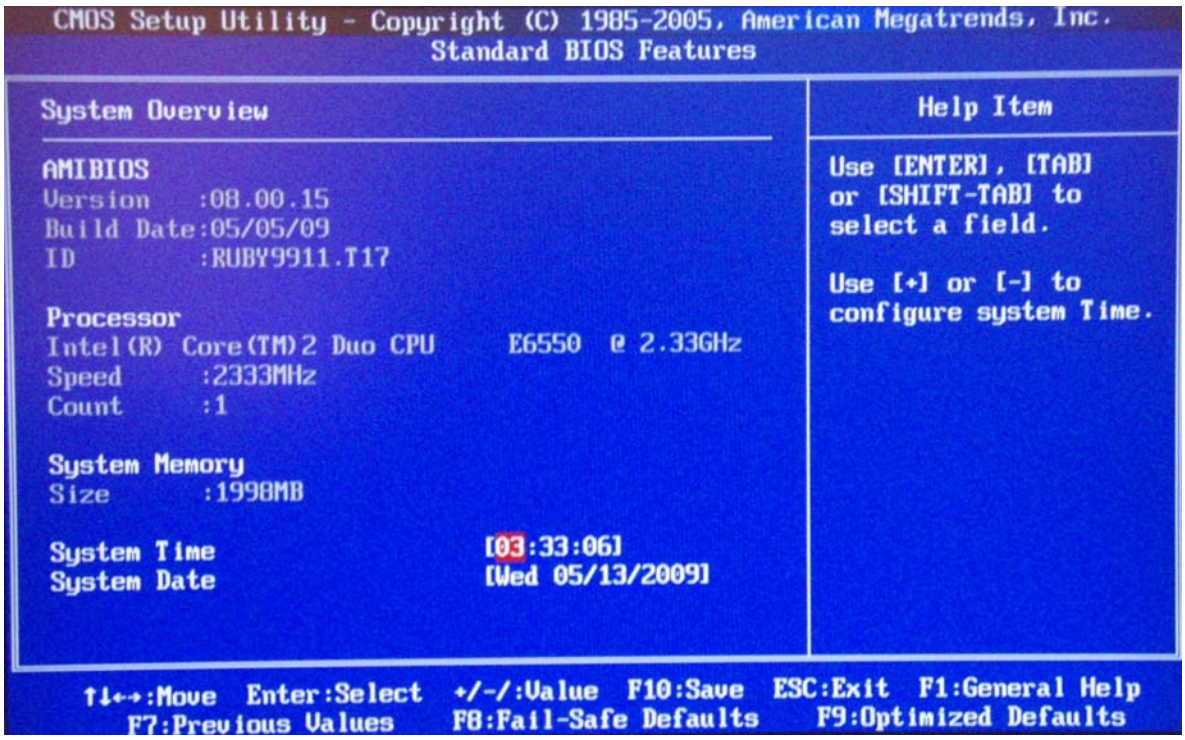
4.2 Main Menu

Once you enter RUBY-9911 AMI BIOS CMOS Setup Utility, a Main Menu is presented. The Main Menu allows user to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Standard BIOS Features
Advanced BIOS Features
Advanced Chipset Features
PCI/PNP Resource Management
Boot Configuration Features
Power Management Features
BIOS Security Features
Load Optimal Defaults
Load Failsafe Defaults
Discard Changes
Save Changes and Exit
Discard Changes and Exit
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults
v02.62 (C)Copyright 1985-2008, American Megatrends, Inc.

Note:
It is strongly recommended to reload Optimal Defaults Setting if CMOS is lost or BIOS is updated.

4.3 Standard BIOS Features



AMI BIOS, Processor, System Memory

These items show the firmware and hardware specifications of your system. Read only.

System Time

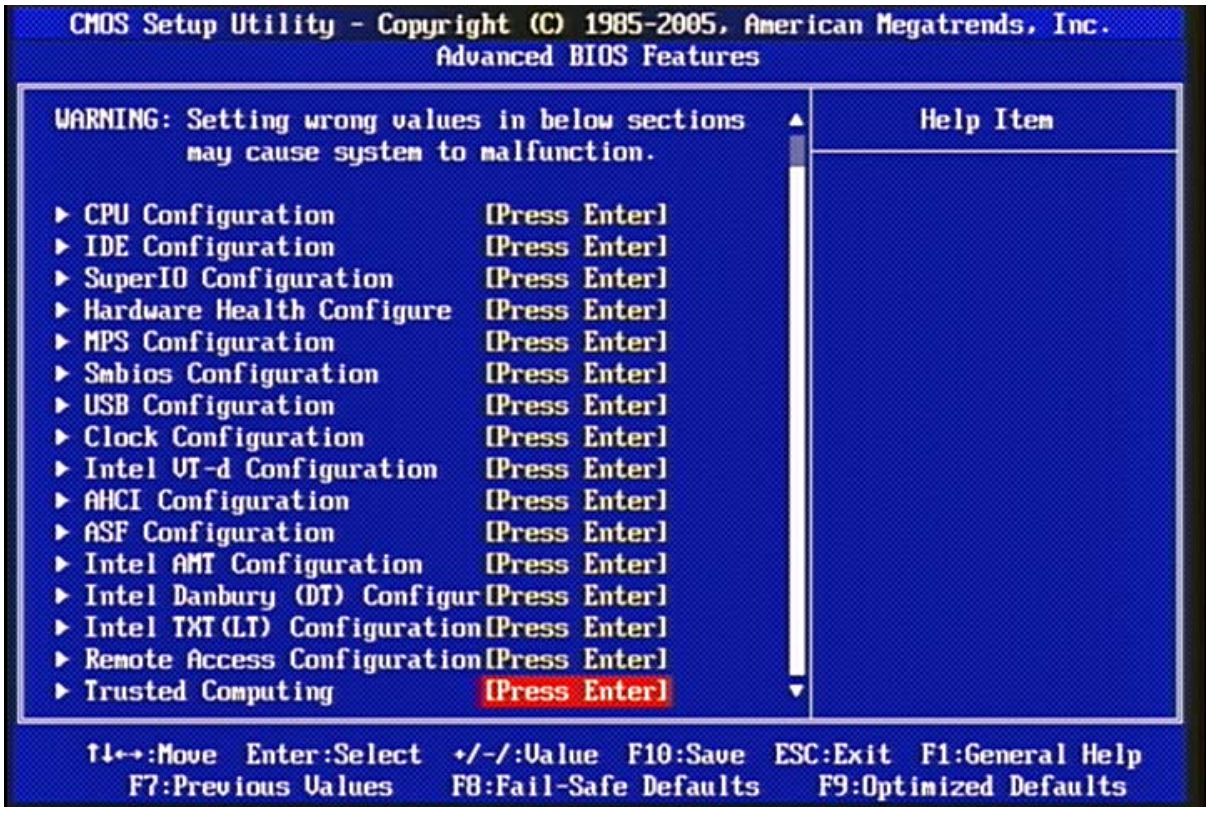
The time format is <Hour> <Minute> <Second>. Use [+] or [−] to configure system Time.

System Date

The date format is <Day>, <Month> <Date> <Year>. Use [+] or [−] to configure system Date.

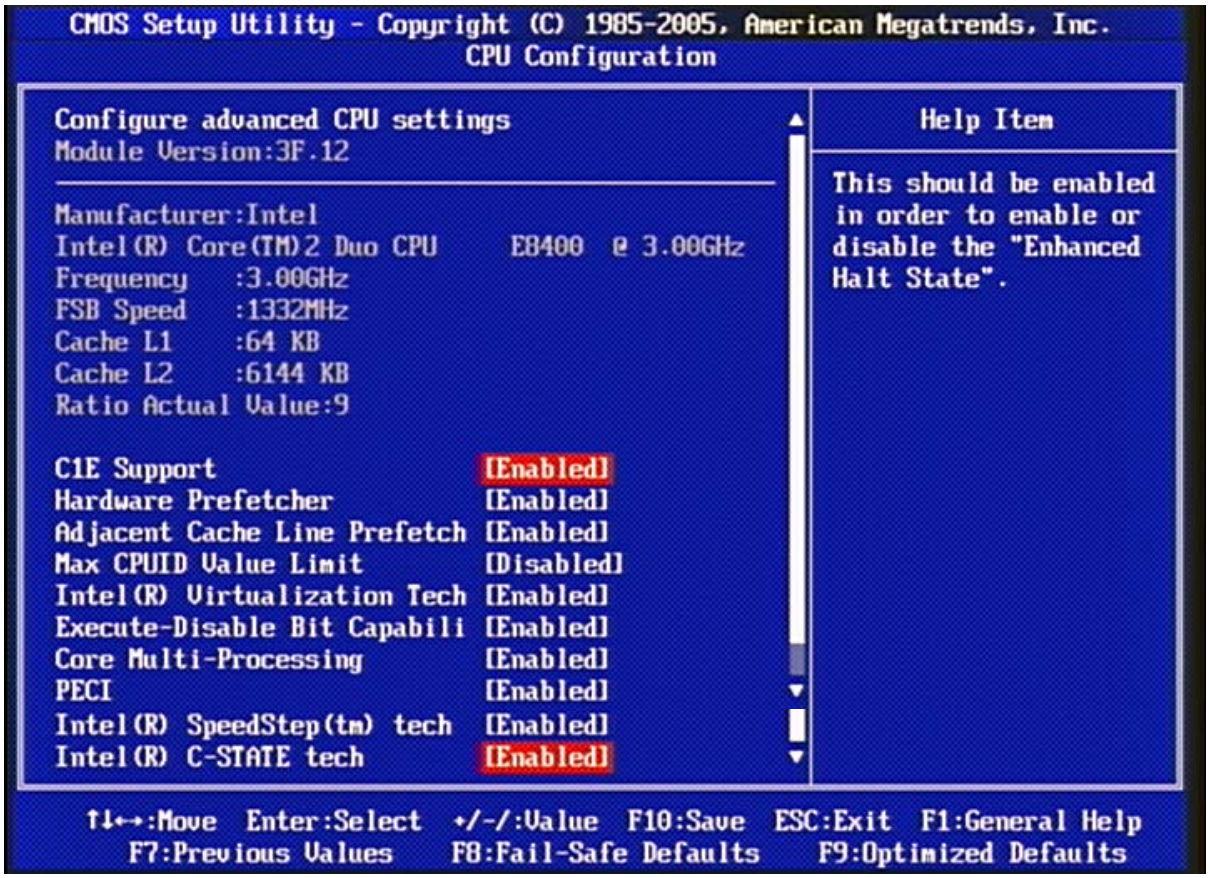
4.4 Advanced BIOS Features

Use this menu to set up the items of special enhanced features.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Advanced BIOS Features
WARNING: Setting wrong values in below sections may cause system to malfunction.
Help Item
CPU Configuration [Press Enter]
IDE Configuration [Press Enter]
SuperIO Configuration [Press Enter]
Hardware Health Configure [Press Enter]
MPS Configuration [Press Enter]
Smbios Configuration [Press Enter]
USB Configuration [Press Enter]
Clock Configuration [Press Enter]
Intel VT-d Configuration [Press Enter]
AHCI Configuration [Press Enter]
ASF Configuration [Press Enter]
Intel AMT Configuration [Press Enter]
Intel Danbury (DT) Configur [Press Enter]
Intel TXT(LT) Configuration [Press Enter]
Remote Access Configuration [Press Enter]
Trusted Computing [Press Enter]
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

CPU Configuration

These items show the advanced specifications of your CPU. Read only.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
CPU Configuration
Configure advanced CPU settings
Module Version:3F.12
Manufacturer:Intel
Intel(R) Core(TM)2 Duo CPU E8400 @ 3.00GHz
Frequency :3.00GHz
FSB Speed :1333MHz
Cache L1 :64 KB
Cache L2 :6144 KB
Ratio Actual Value:9
C1E Support [Enabled]
Hardware Prefetcher [Enabled]
Adjacent Cache Line Prefetch [Enabled]
Max CPUID Value Limit [Disabled]
Intel(R) Virtualization Tech [Enabled]
Execute-Disable Bit Capabili [Enabled]
Core Multi-Processing [Enabled]
PECI [Enabled]
Intel(R) SpeedStep(tm) tech [Enabled]
Intel(R) C-STATE tech [Enabled]
Help Item
This should be enabled in order to enable or disable the "Enhanced Halt State".
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

C1E Support

This should be enabled in order to enable or disable the “Enhanced Halt State”.

The choice: Disabled, Enabled.

Hardware Prefetcher

For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance to the specific application.

The choice: Disabled, Enabled.

Adjacent Cache Line Prefetch

For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance the specific application.

The choice: Disabled, Enabled.

Max CPUID Value Limit

Disabled for Windows XP

The choice: Disabled, Enabled.

Intel(R) Virtualization Tech

When enabled, a VMM can utilize the additional HW Caps, provided by Intel(R) Virtualization Tech.
Note: A full reset is required to change the setting.

The choice: Disabled, Enabled.

Execute-Disable Bit capability

When disabled, force the XD feature flag to always return 0.

The choice: Disabled, Enabled.

Core Multi-Processing

When disabled, disable one execution core of each CPU die.

The choice: Disabled, Enabled.

PECI

When enabled, enables PECI interface.

The choice: Disabled, Enabled.

Intel(R) Speed Step (tm) Tech

Disable: Disable GV3.
Enable: Enable GV3.

The choice: Disabled, Enabled.

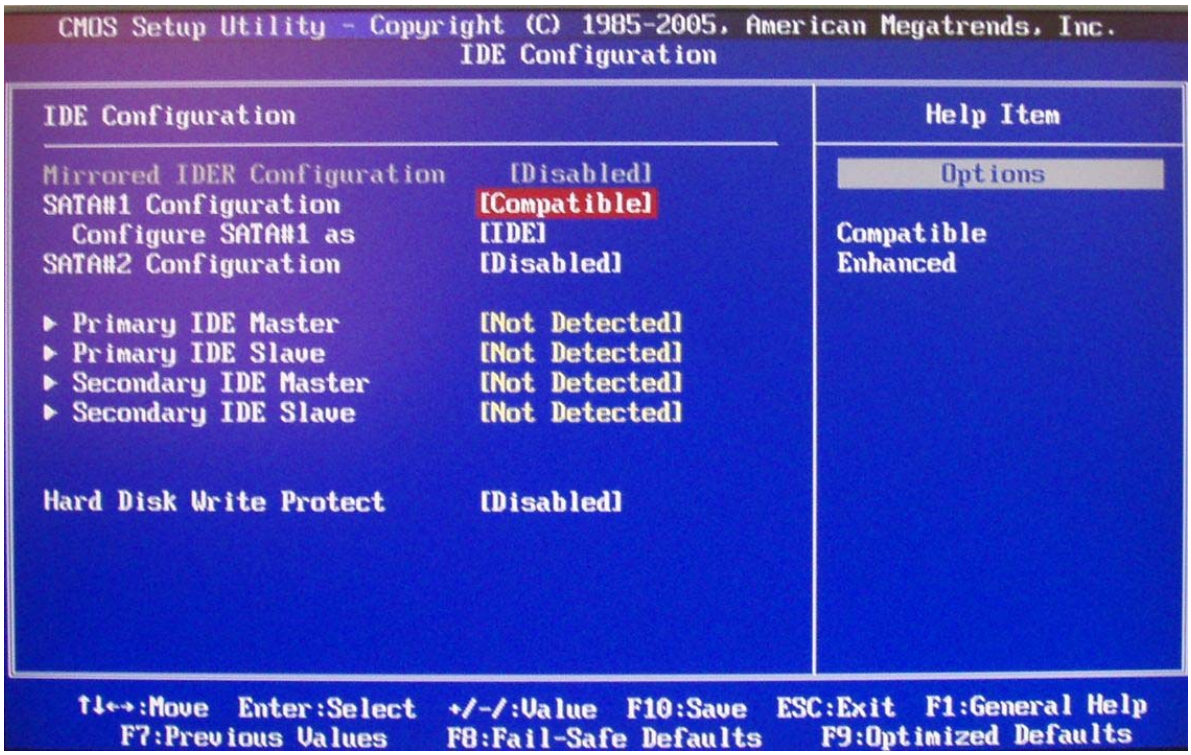
Intel(R) C-STATE Tech

CPU idle is set to C2/C3/C4.

The choice: Disabled, Enabled.

IDE Configuration

The IDE Configuration the IDE devices, such as hard disk drive or CD-ROM drive. It uses a separate sub menu to configure each hard disk drive (Master and Slave).



Mirrored IDER Configuration

The choice: Disabled, Enabled.

SATA#1 Configuration

The choice: Compatible, Enhanced.

SATA#2 Configuration

The choice: Disabled, Enhanced

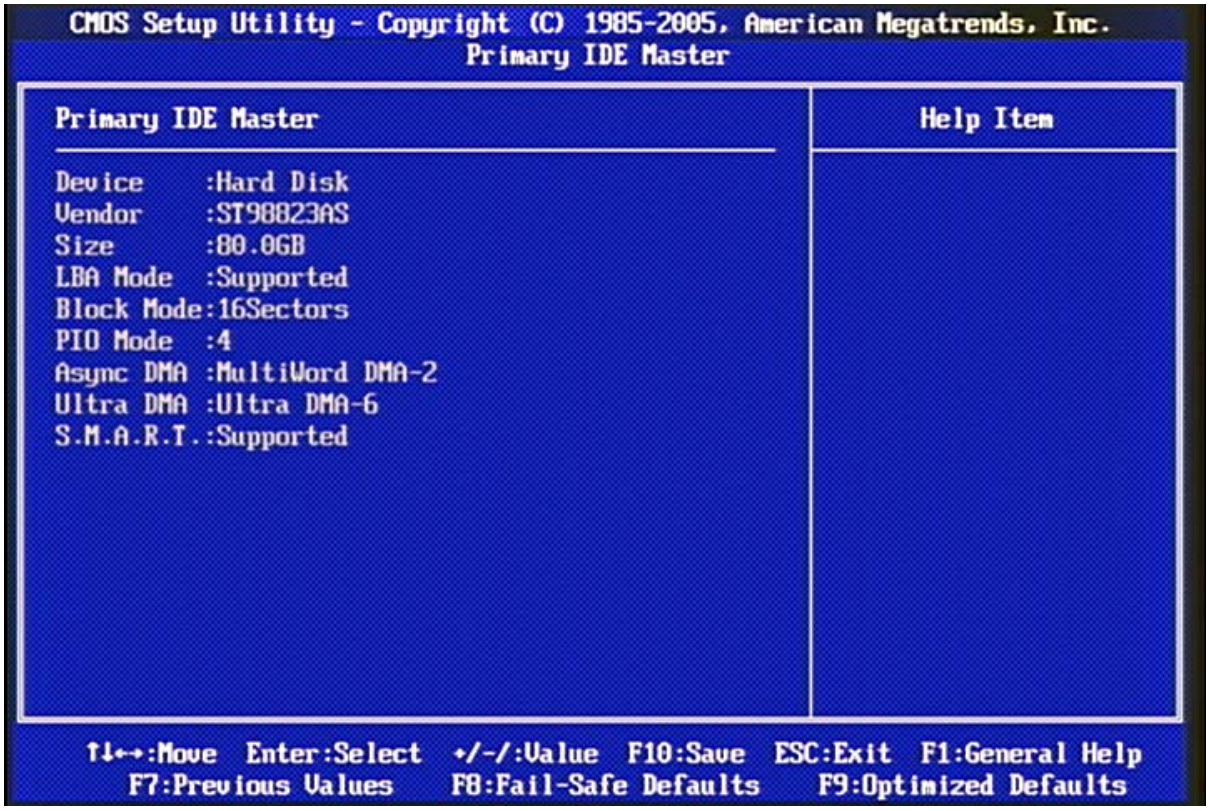
Configure SATA#1 as

This setting specifies the function of the on-chip SATA#1 controller.

The choice: IDE, RAID, AHCI.

Primary/Secondary IDE Master / Slave

While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.



Those options as below are read only.

[Device] It shows the drive type automatically.

[Vender] It shows model name of the drive.

[Size] It shows all disk space of the drive.

[LBA Mode] Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads and Sectors.

[Block Mode] Any selection except Disabled determines the number of sectors transferred per block.

[PIO Mode] Indicates the type of PIO (Programmed Input/Output)

[Async DMA] Indicates the type of Async DMA

[Ultra DMA] Indicates the type of Ultra DMA

[S.M.A.R.T.] This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S. M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.

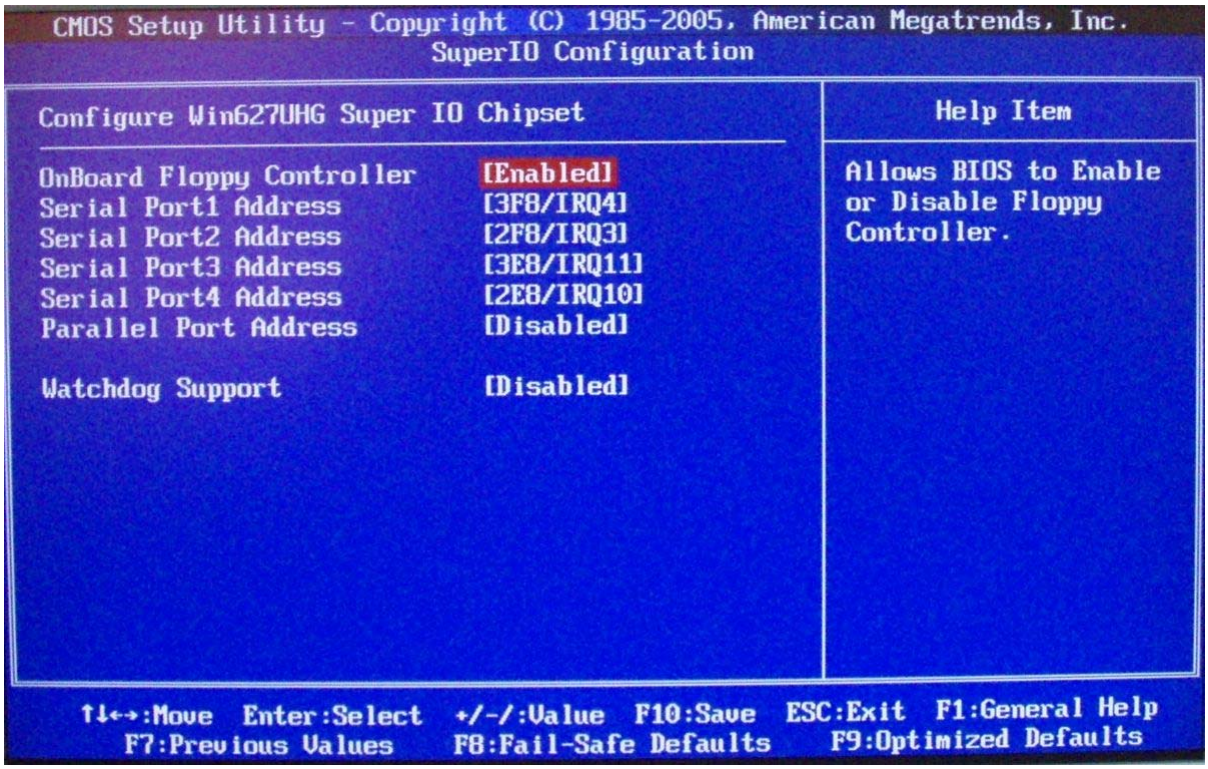
Hard Disk Write Protect

Disabled/Enabled device write protection, this will be effective only if device is accessed through BIOS.

The choice: Disabled, Enabled.

Super IO Configuration

Configure Win627DHG Super IO Chipset.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
SuperIO Configuration
Configure Win627UHG Super IO Chipset
Help Item
OnBoard Floppy Controller [Enabled]
Serial Port1 Address [3F8/IRQ4]
Serial Port2 Address [2F8/IRQ3]
Serial Port3 Address [3E8/IRQ11]
Serial Port4 Address [2E8/IRQ10]
Parallel Port Address [Disabled]
Watchdog Support [Disabled]
Allows BIOS to Enable or Disable Floppy Controller.
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Serial Port 1 Address

Allows BIOS to Select Serial Port1 Base Addresses.

The choice: Disabled, 3F8/IRQ4, 3E8/IRQ4

Serial Port 2 Address

Allows BIOS to Select Serial Port2 Base Addresses.

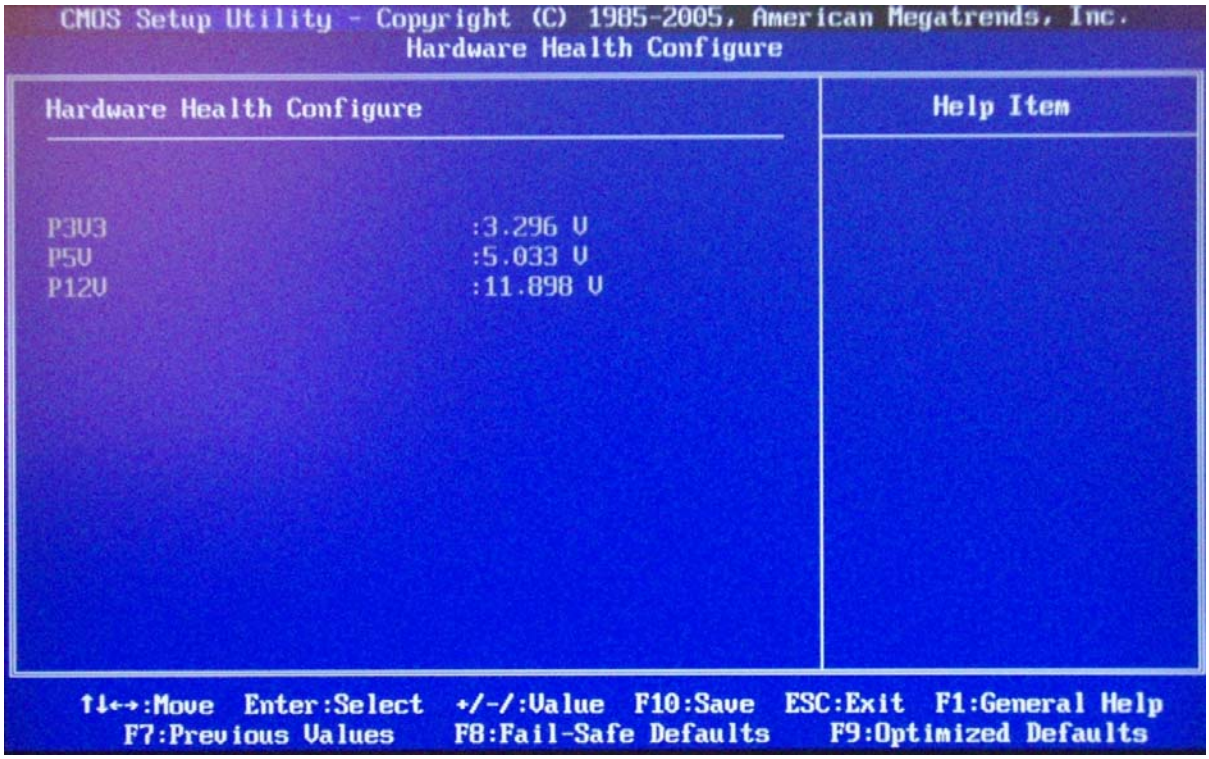
The choice: Disabled, 2F8/IRQ3, 2E8/IRQ3.

Watchdog Support

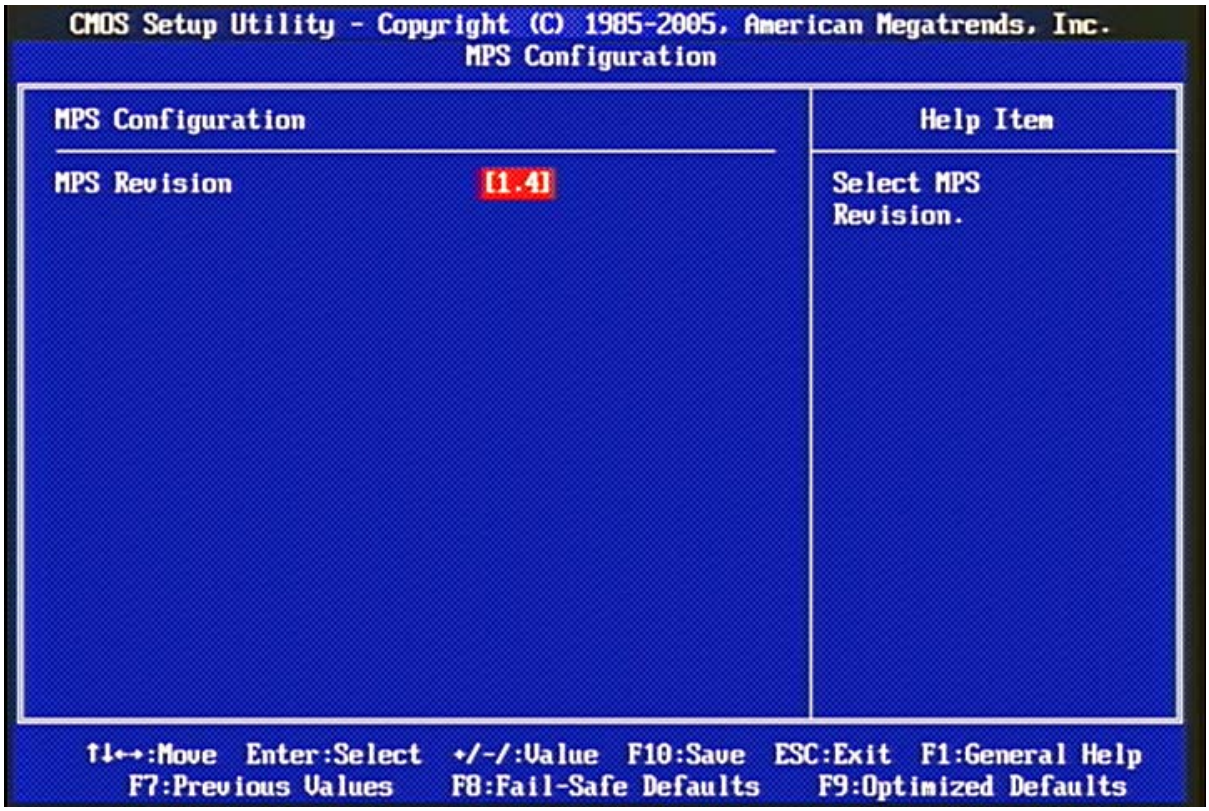
The choice: Disabled, Enabled

Hardware Health Configure

Configuration / Monitor the Hardware Health. Read only.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Hardware Health Configure
Hardware Health Configure
Help Item
P3V3 :3.296 V
P5V :5.033 V
P12V :11.898 V
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

MPS Configuration



MPS Revision

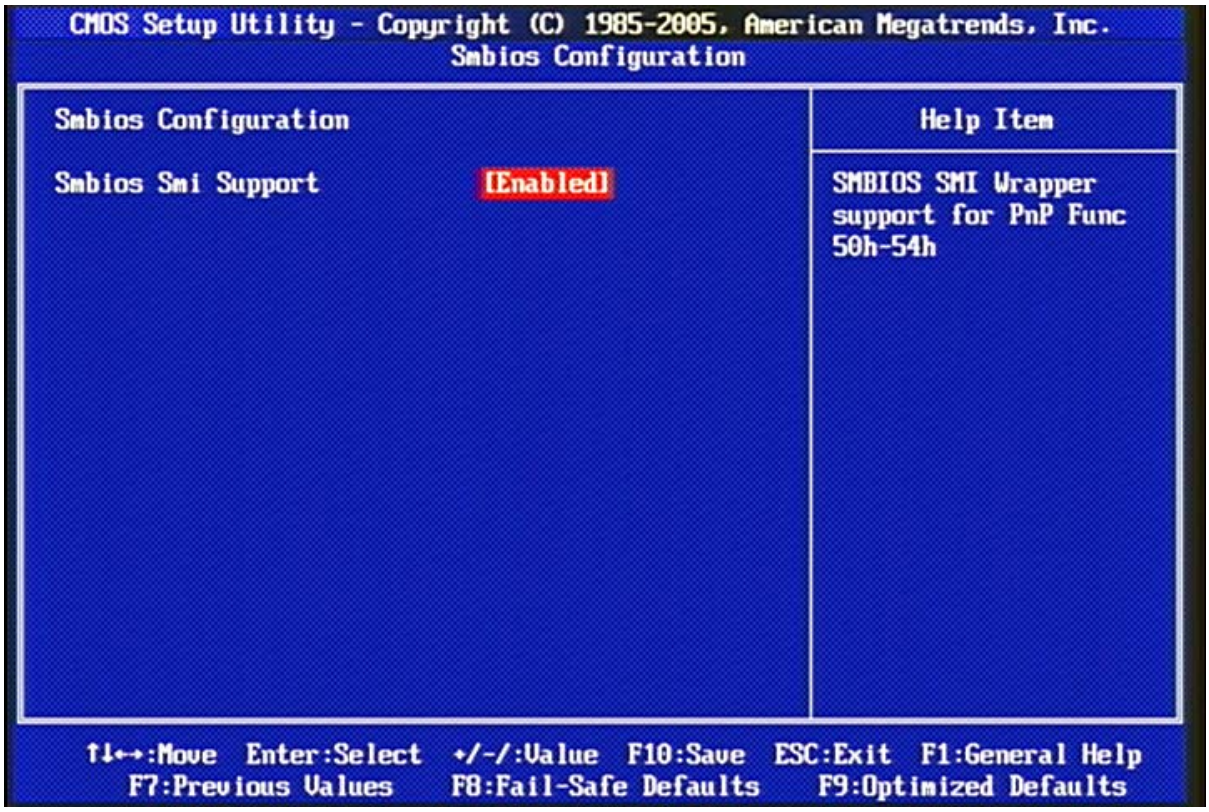
Select MPS Revision

This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system.

The choice: 1.1, 1.4.

Smbios Configuration

SMBIOS Configuration Menu


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Smbios Configuration
Smbios Configuration
Smbios Smi Support
[Enabled]
Help Item
SMBIOS SMI Wrapper support for PnP Func 50h-54h
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

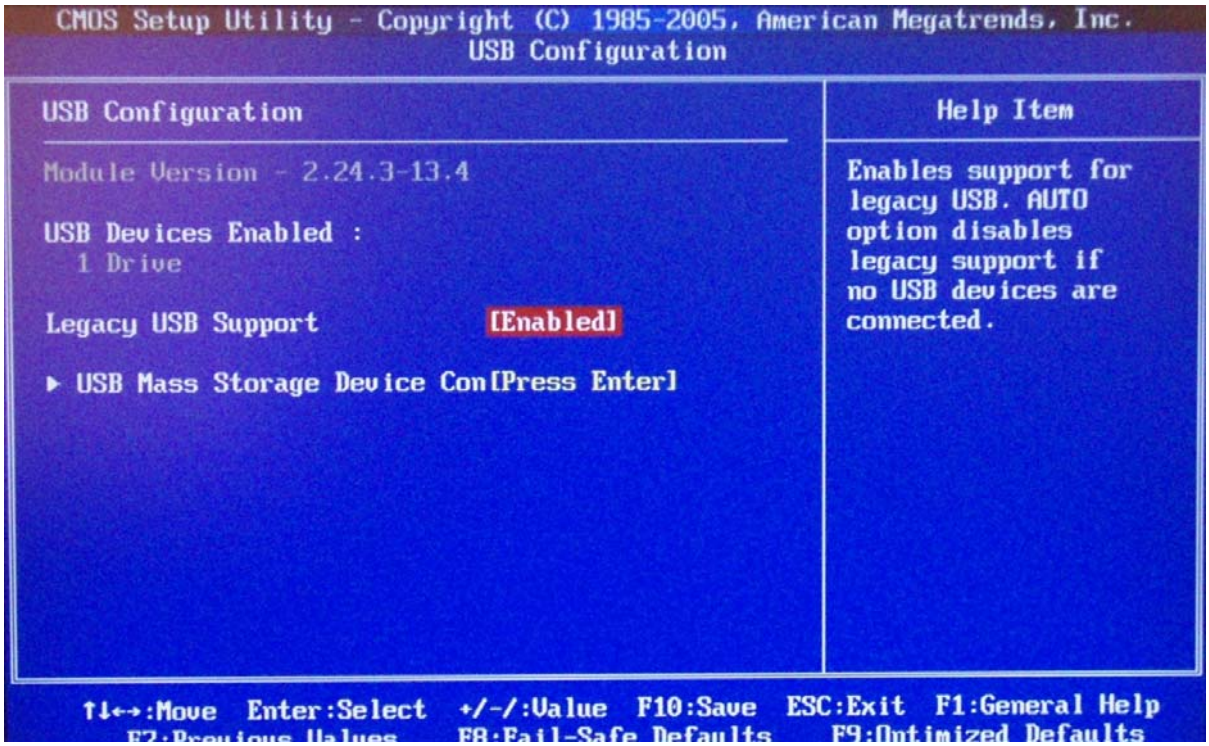
Smbios Smi Support

SMBIOS SMI Wrapper support for PnP Function 50h-54h

The choice: Disabled, Enabled.

USB Configuration

Enables support for Legacy USB. AUTO option disables legacy support if no USB devices are connected.

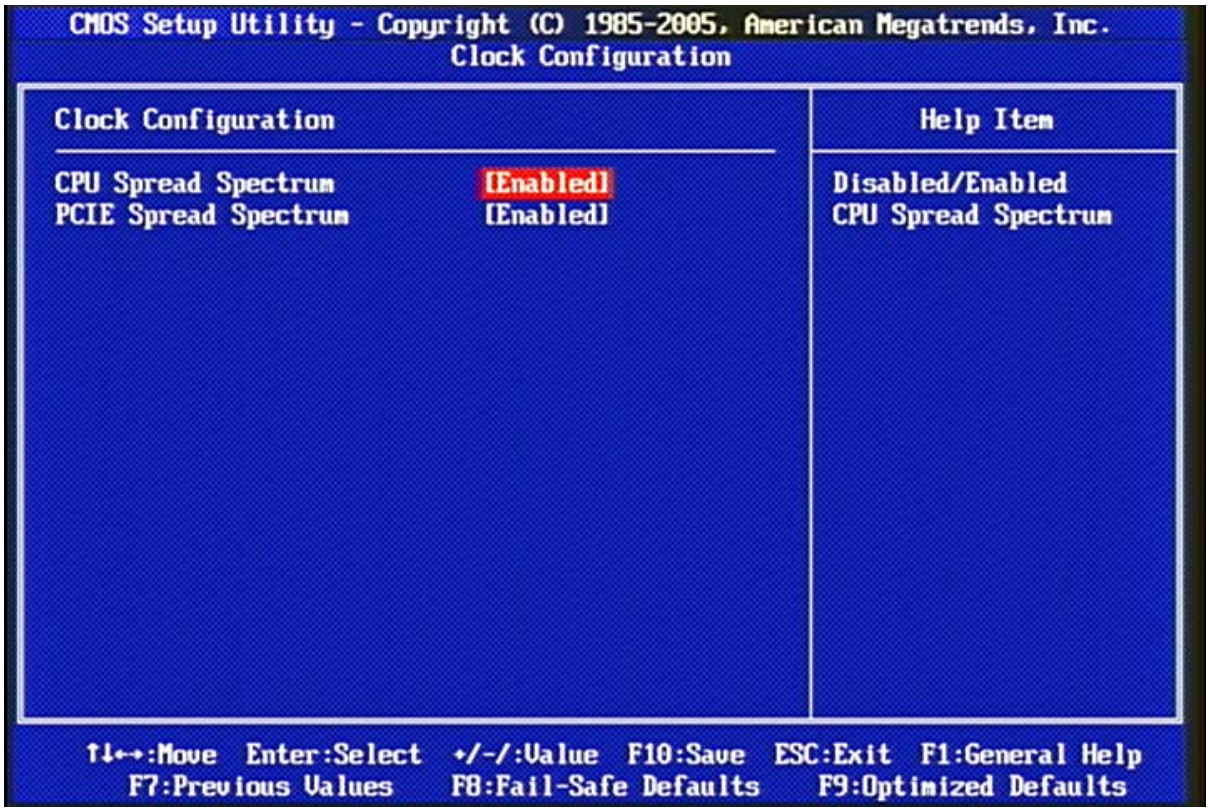

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
USB Configuration
USB Configuration
Module Version - 2.24.3-13.4
USB Devices Enabled :
1 Drive
Legacy USB Support [Enabled]
▶ USB Mass Storage Device Con[Press Enter]
Help Item
Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help

Legacy USB Support

Set to [Enabled] if you need to use any USB 1.1/2.0 device in the operating system that does not support or have any USB 1.1/2.0 driver installed, such as DOS and SCO Unix.

The choice: Disabled, Enabled, Auto.

Clock Configuration



CPU Spread Spectrum

Disabled/Enabled CPU Spread Spectrum

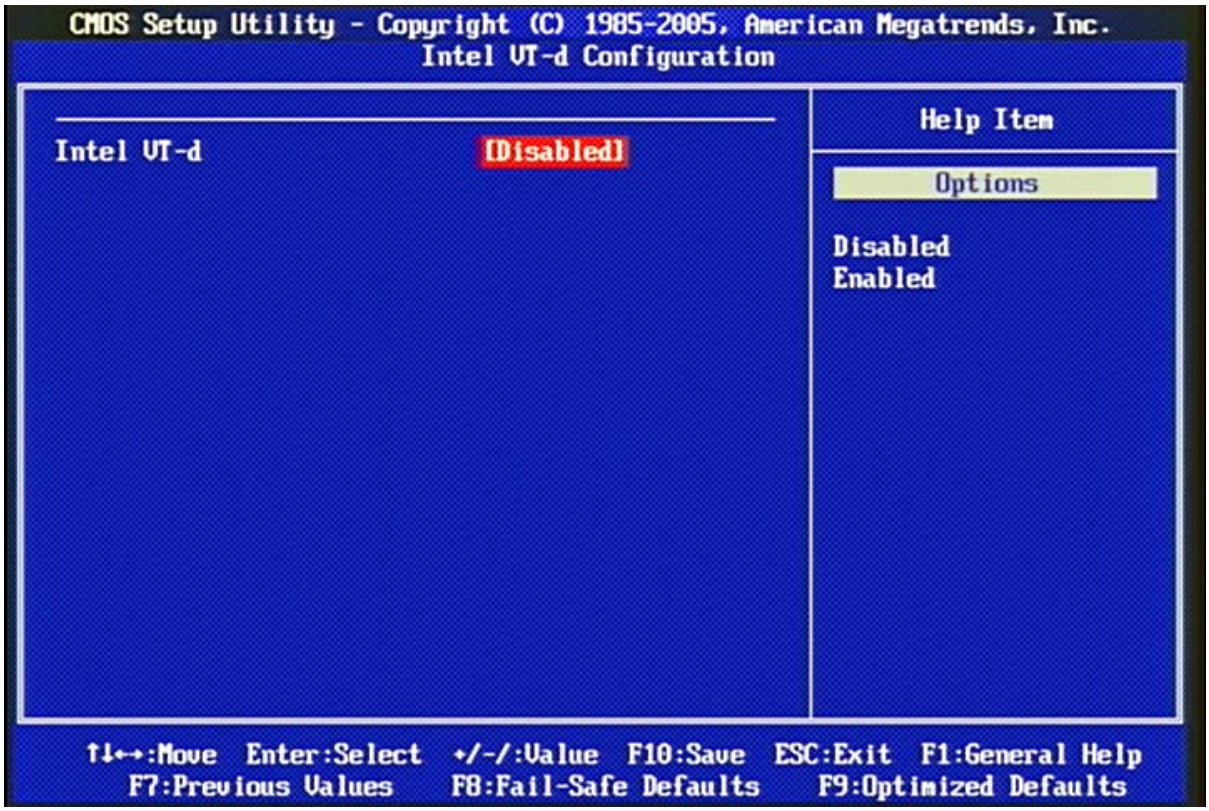
The choice: Disabled, Enabled.

PCIE Spread Spectrum

Disabled/Enabled PCIE Spread Spectrum

The choice: Disabled, Enabled.

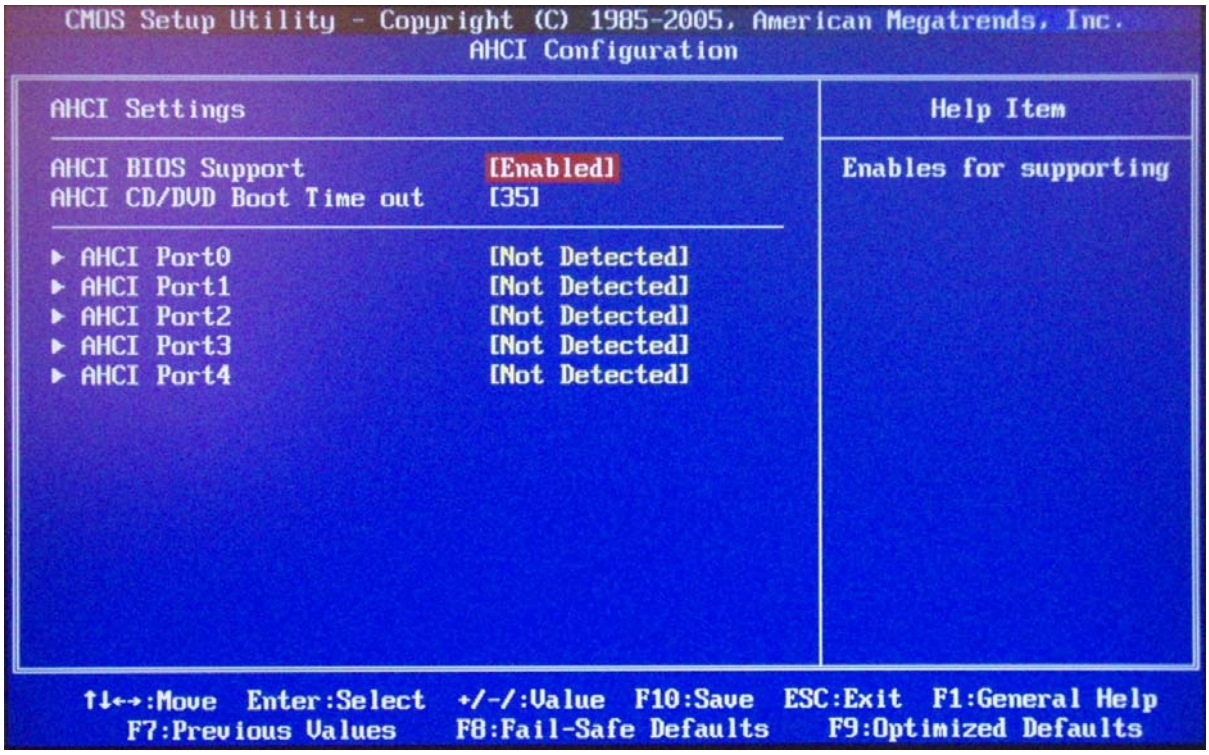
Intel VT-d Configuration



Intel VT-d

The choice: Disabled, Enabled.

AHCI Settings


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
AHCI Configuration
AHCI Settings
Help Item
AHCI BIOS Support [Enabled]
AHCI CD/DVD Boot Time out [35]
Enables for supporting
AHCI Port0 [Not Detected]
AHCI Port1 [Not Detected]
AHCI Port2 [Not Detected]
AHCI Port3 [Not Detected]
AHCI Port4 [Not Detected]
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

AHCI BIOS Support

Enables for supporting

The choice: Disabled, Enabled.

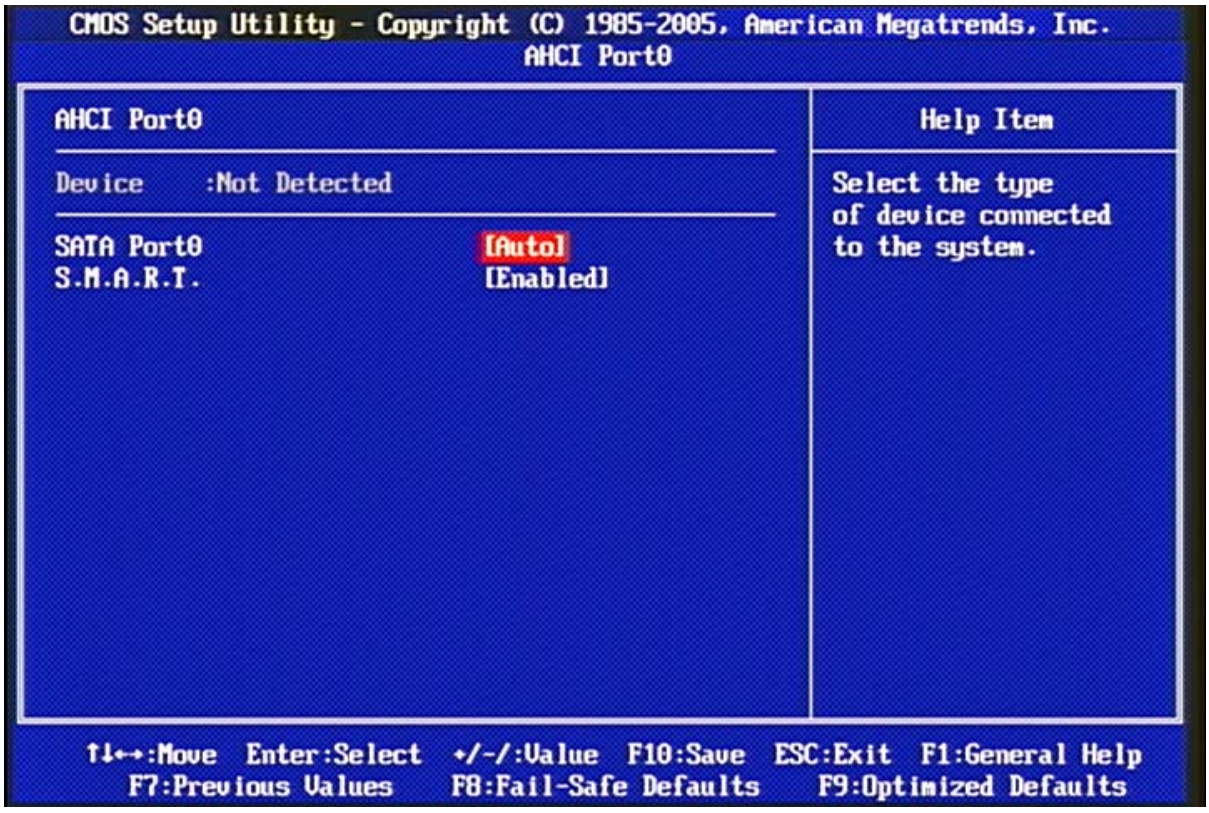
AHCI CD/DVD Boot Time out

Some SATA CD/DVD in AHCI mode need to wait ready longer.

The choice: 0, 5, 10, 15, 20, 25, 30, 35.

AHCI Port0 ~ Port4

While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
AHCI Port0
AHCI Port0
Device :Not Detected
SATA Port0 [Auto]
S.M.A.R.T. [Enabled]
Help Item
Select the type of device connected to the system.
↑↓→←:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

SATA Port0 ~ Port3

Select the type of device connected to the system.

The choice: Auto, Not Installed.

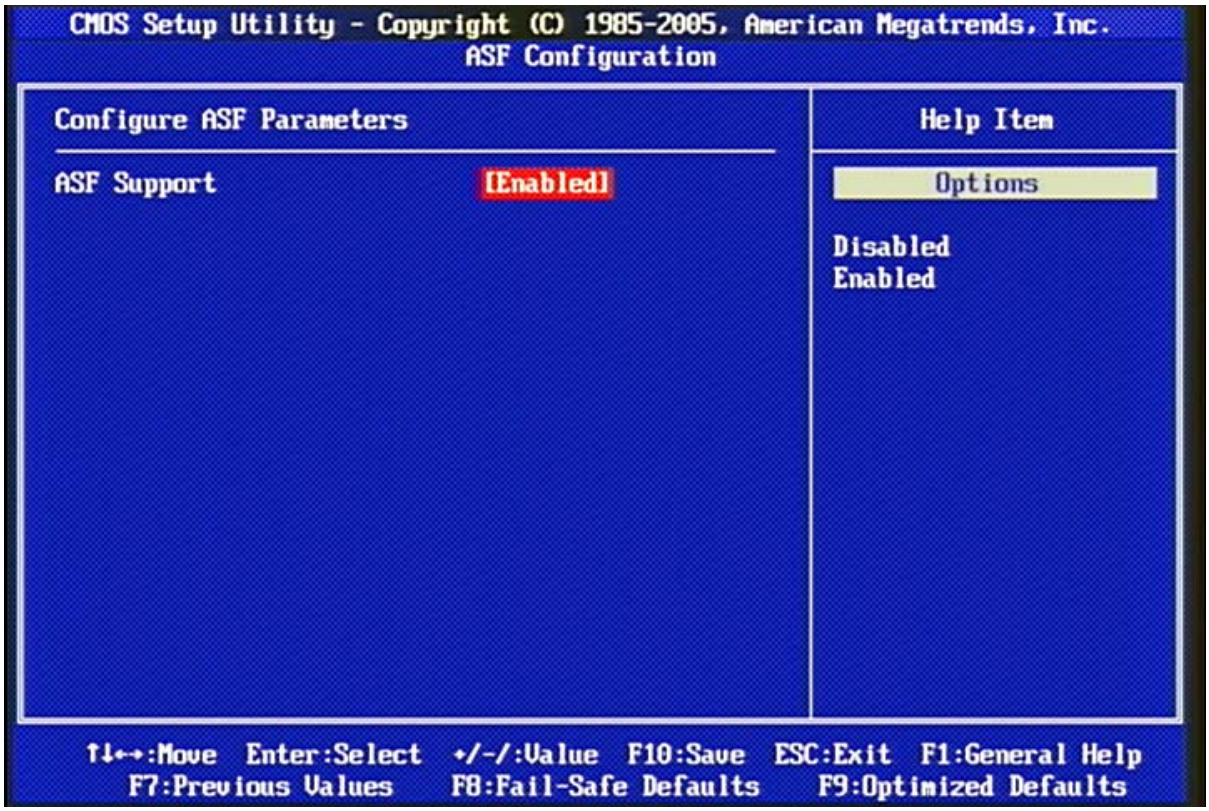
S.M.A.R.T

S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S. M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.

The choice: Disabled, Enabled.

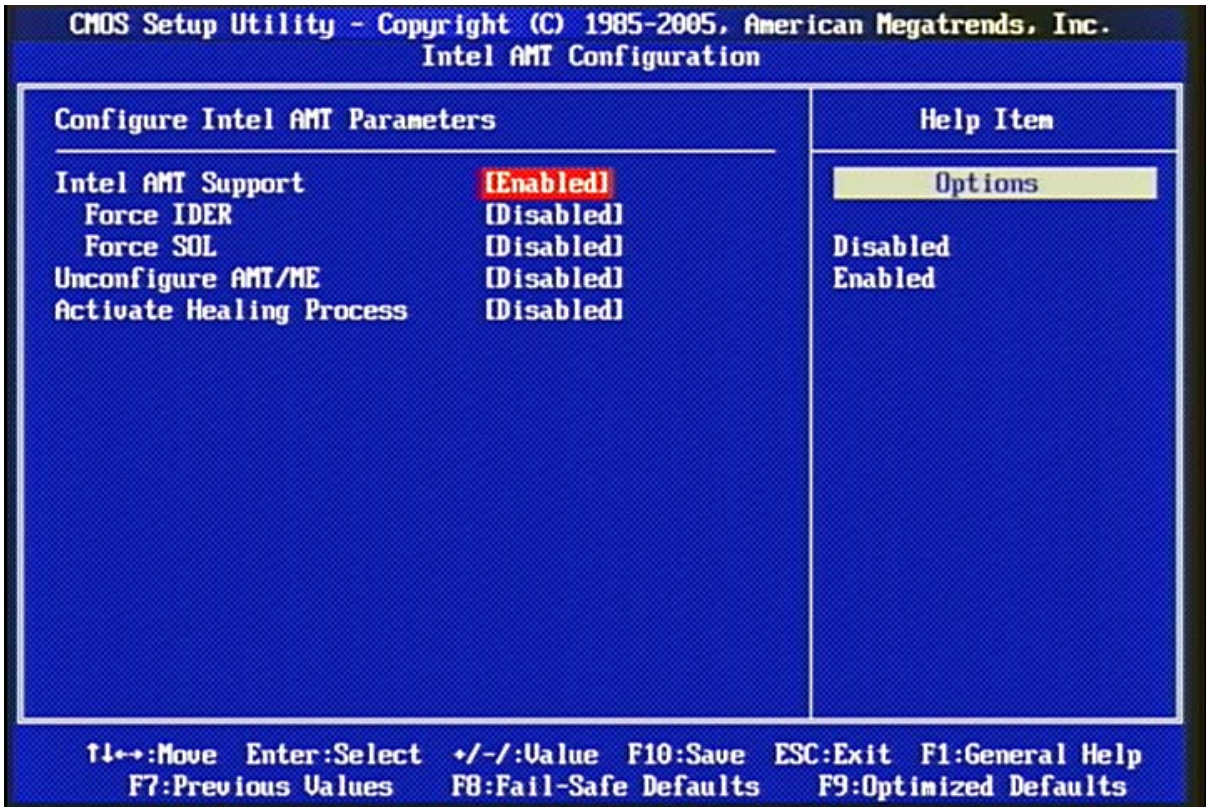
Configure ASF Parameters



ASF Support

The choice: Disabled, Enabled.

Configure Intel AMT Parameters



Intel AMT Support

The choice: Disabled, Enabled.

Force IDER

The choice: Disabled, IDER Pri. Master, IDER Pri. Slave, IDER Sec. Master, IDER Sec. Slave

Force SOL

The choice: Disabled, Enabled.

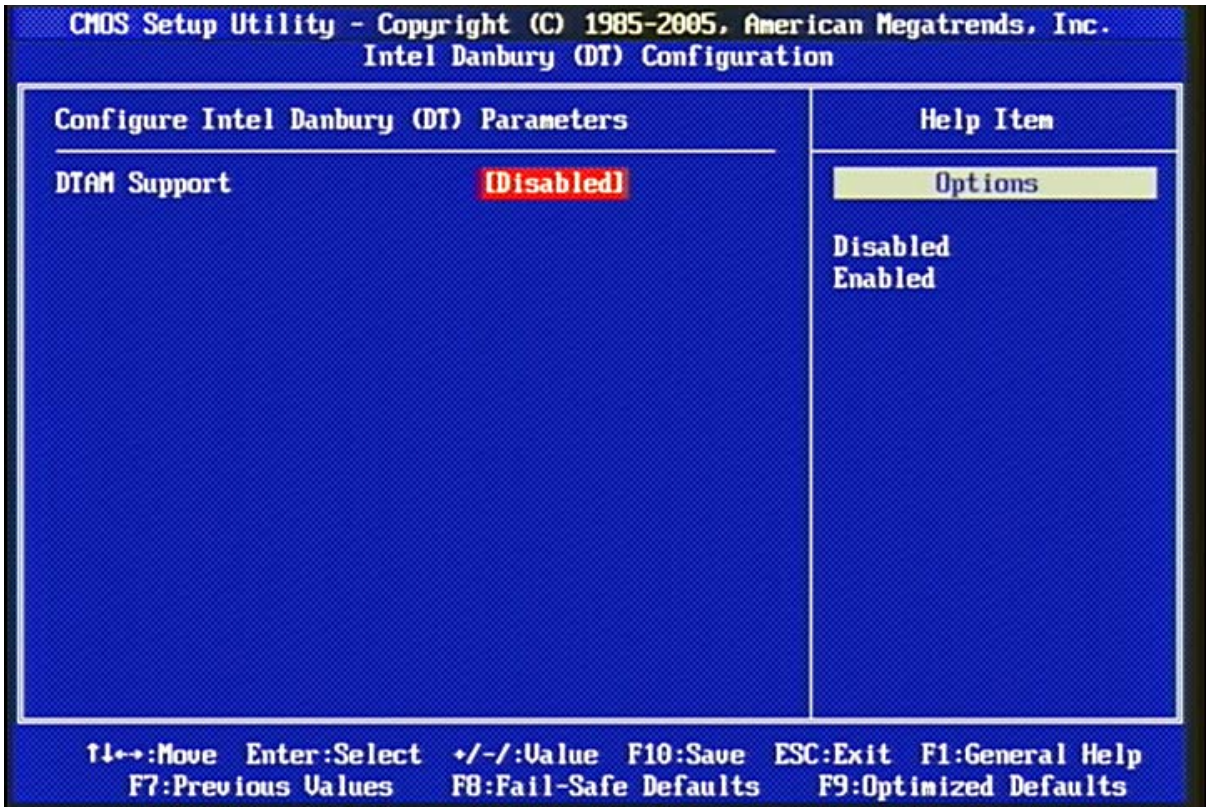
Unconfigure AMT/ME

The choice: Disabled, Enabled.

Activate Healing Process

The choice: Disabled, Enabled.

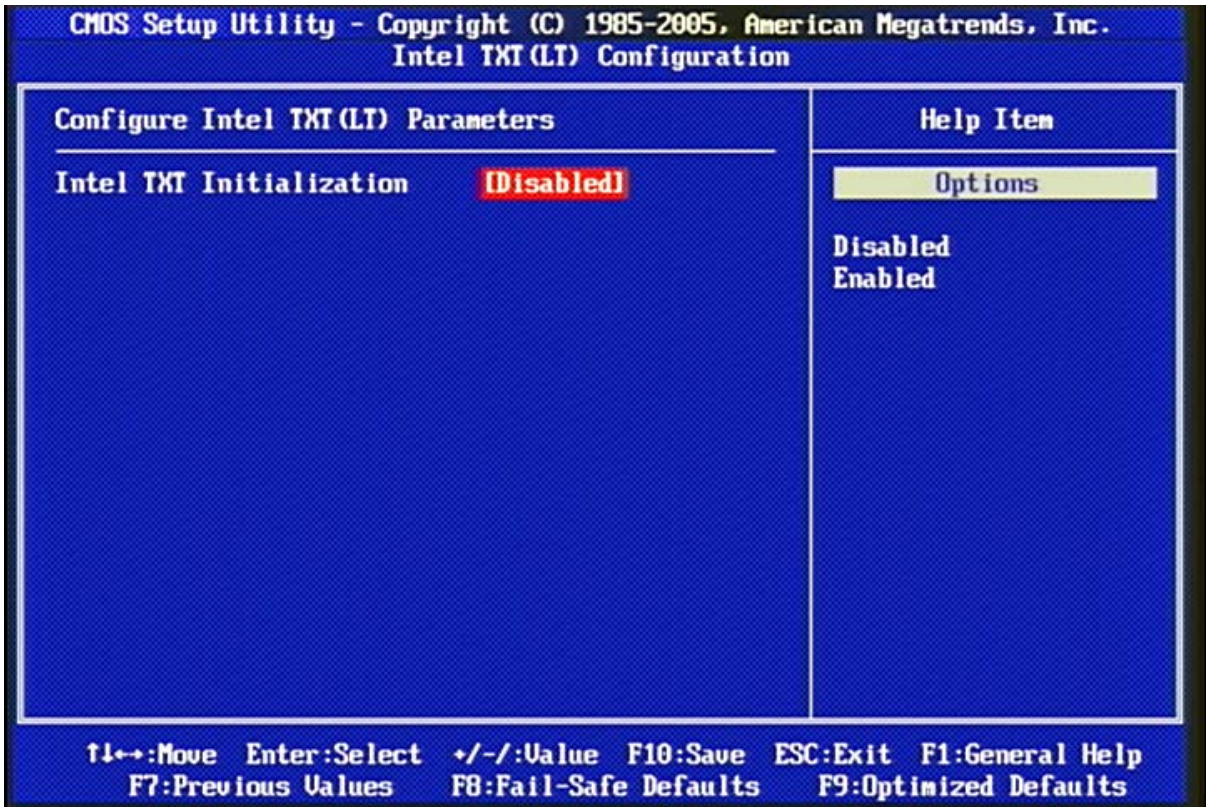
Configure Intel Danbury (DT) Parameters



DTAM Support

The choice: Disabled, Enabled.

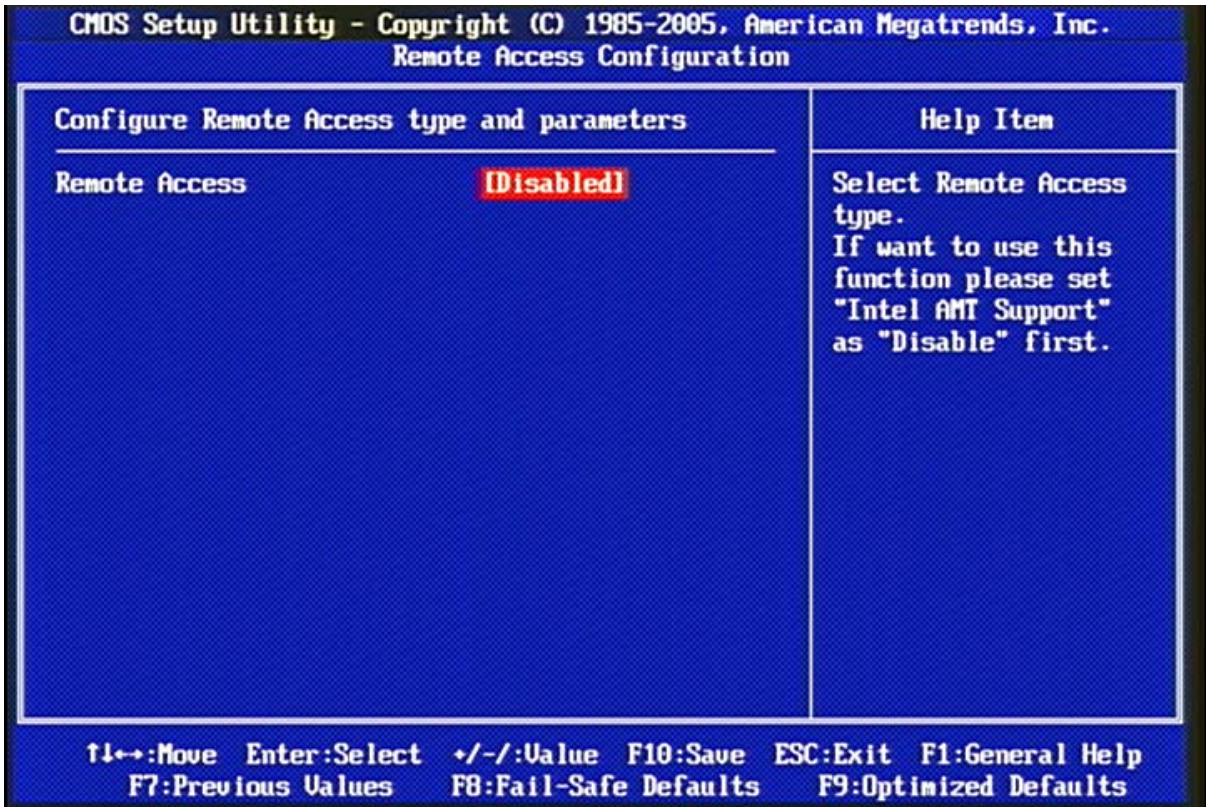
Configure Intel TXT (LT) Parameters



Intel TXT Initialization

The choice: Disabled, Enabled.

Configure Remote Access type and parameters

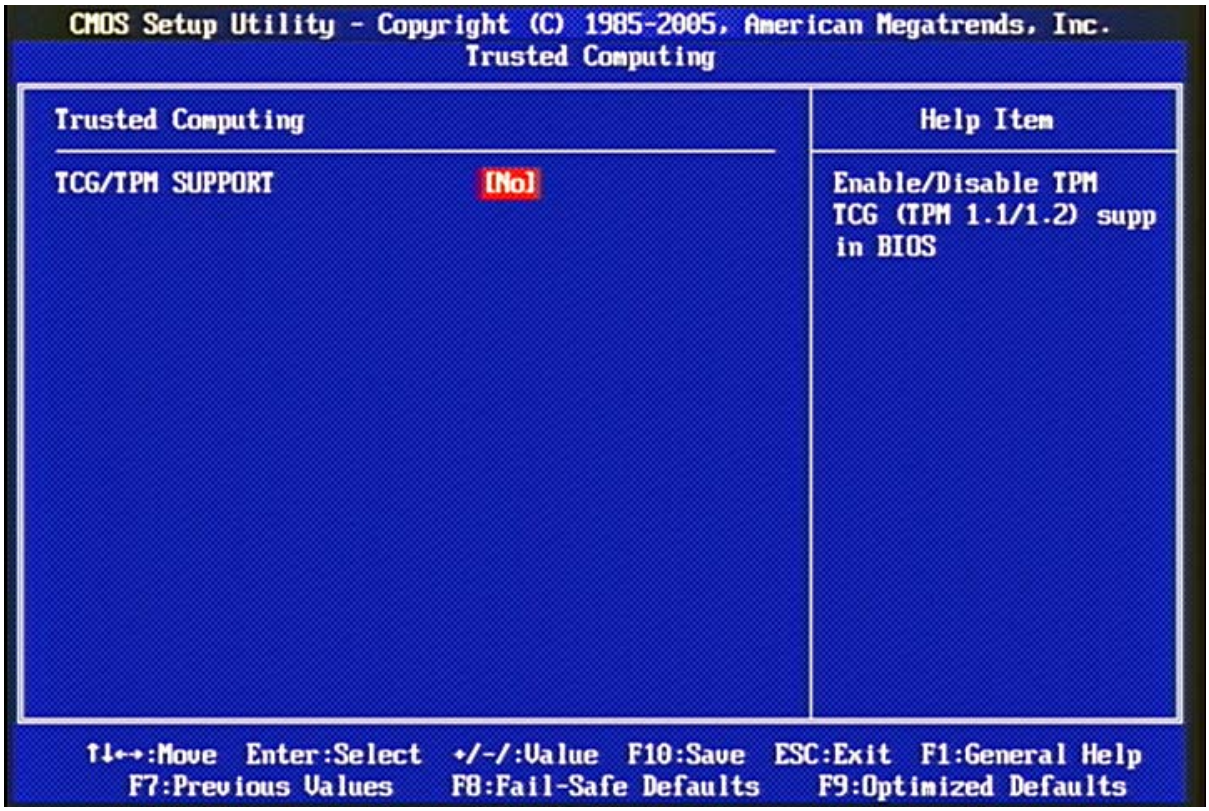

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Remote Access Configuration
Configure Remote Access type and parameters
Help Item
Remote Access
[Disabled]
Select Remote Access type.
If want to use this function please set "Intel AMT Support" as "Disable" first.
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Remote Access

Select Remote Access type. If want to use this function please set "Intel AMT Support" as "Disable" first.

The choice: Disabled, Enabled.

Trusted Computing



TCG/TPM SUPPORT

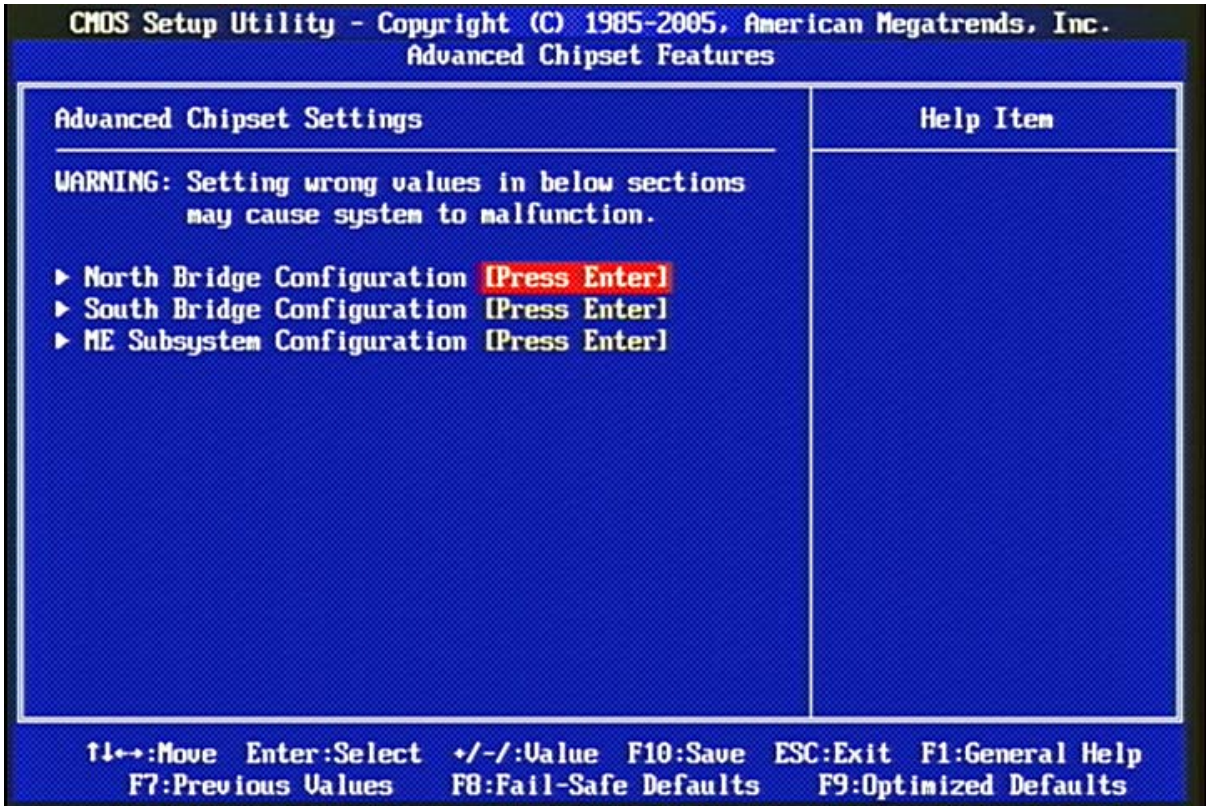
Enabled/Disable TPM TCG (TPM 1.1/1.2) supp in BIOS.

The choice: No, Yes.

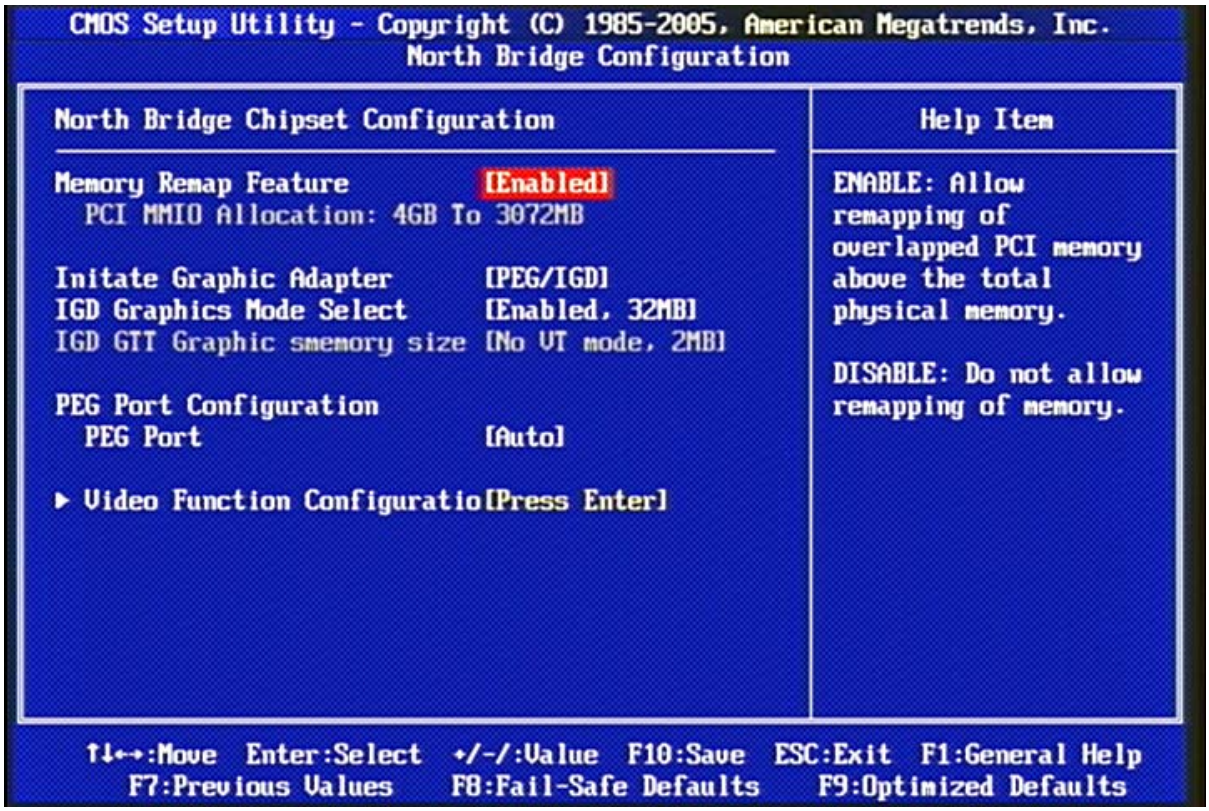
4.5 Advanced Chipset Features

Advance Chipset Settings

This menu controls the advanced features of the onboard Northbridge/Southbridge and ME Subsystem.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Advanced Chipset Features
Advanced Chipset Settings
Help Item
WARNING: Setting wrong values in below sections
may cause system to malfunction.
North Bridge Configuration [Press Enter]
South Bridge Configuration [Press Enter]
ME Subsystem Configuration [Press Enter]
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

North Bridge Chipset Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
North Bridge Configuration
North Bridge Chipset Configuration
Help Item
Memory Remap Feature [Enabled]
PCI MMIO Allocation: 4GB To 3072MB
Initate Graphic Adapter [PEG/IGD]
IGD Graphics Mode Select [Enabled, 32MB]
IGD GTT Graphic smemory size [No VT mode, 2MB]
PEG Port Configuration
PEG Port [Auto]
▶ Video Function Configuratio[Press Enter]
ENABLE: Allow remapping of overlapped PCI memory above the total physical memory.
DISABLE: Do not allow remapping of memory.
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Memory Remap Feature

ENABLE: Allow remapping of overlapped PCI memory above the total physical memory. DISBALE: Do not allow remapping of memory.

The choice: Disabled, Enabled.

PCI MMIO Allocation

4GB to 3072MB. (Read Only)

Initate Graphic Adapter

Select which graphics controller to use as the primary boot device.

The choice: IGD, PEG/IGD.

IGD Graphics Mode Select

Select the amount of system memory used by the internal graphics device.

The choice: Enabled, 32MB, Enabled, 64MB, Enabled, 128MB.

IGD GTT Graphic smemory size

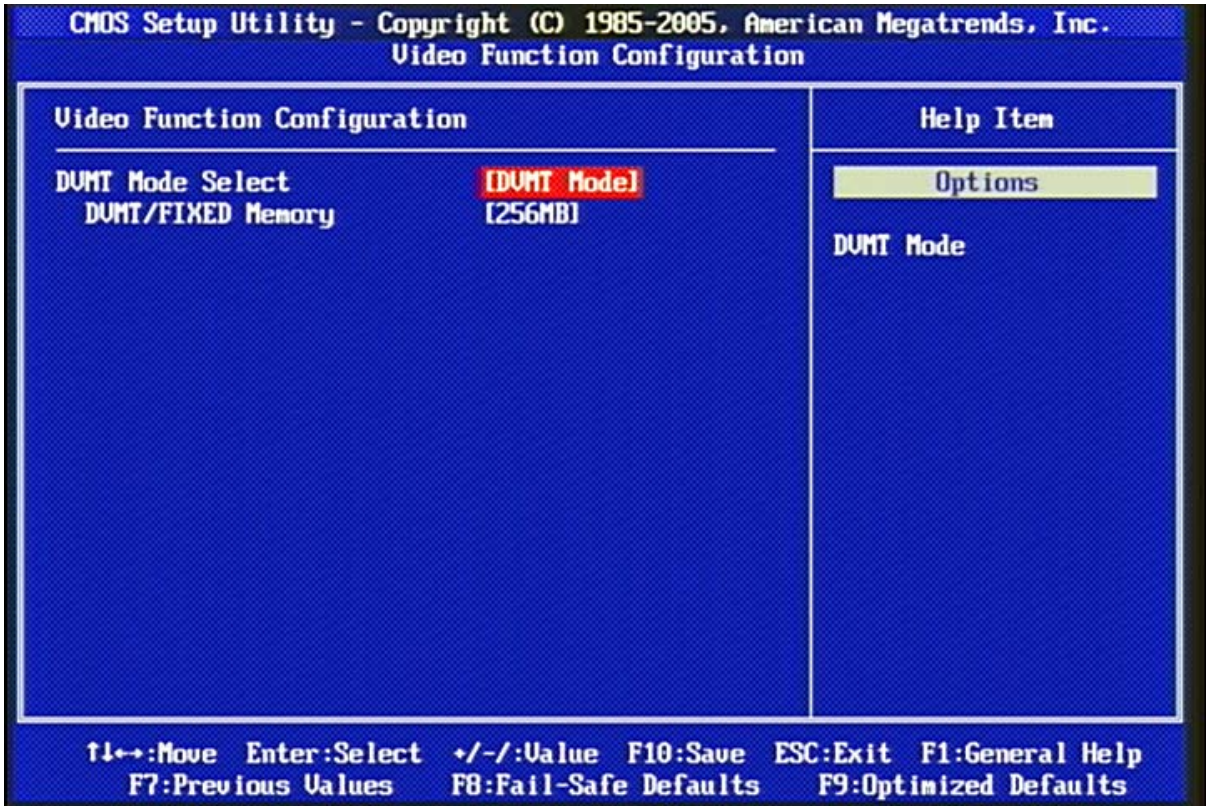
No VT mode, 2MB. (Read Only)

PEG Port Configuration

This setting allows you to select whether to use the on-chip graphics processor or the PCI Express card. When set to [Auto], the BIOS checks to see if a PCI Express graphics card is installed. If it detects that a PCI Express graphics card is present, the motherboard boots up using that card. Otherwise, it defaults to the onboard graphics processor.

The choice: Auto, Disabled.

Video Function Configuration



DVMT Mode Select

Intel's Dynamic Video Memory Technology (DVMT) allows the system to dynamically allocate memory resources according to the demands of the system at any point in time. The key idea in DVMT is to improve the efficiency of the memory allocated to either system or graphics processor.

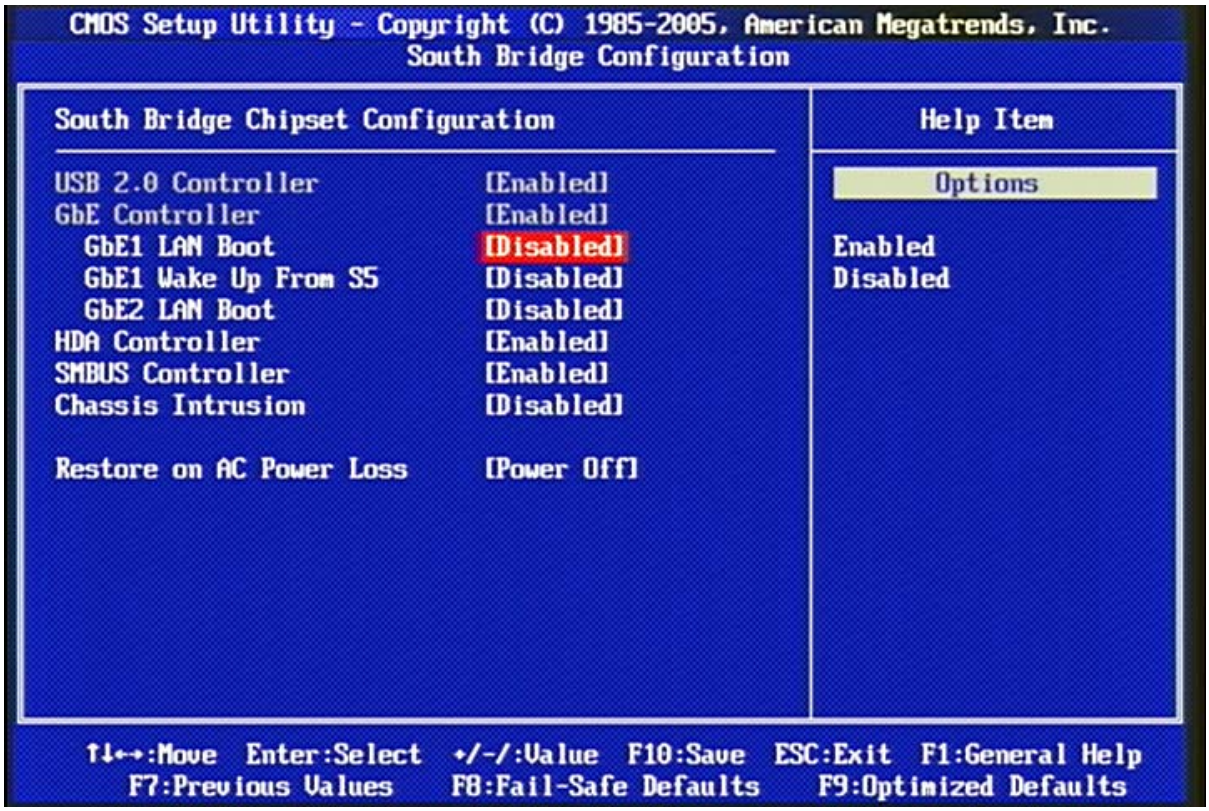
It is recommended that you set this BIOS feature to DVMT Mode for maximum performance. Setting it to DVMT Mode ensures that system memory is dynamically allocated for optimal balance between graphics and system performance.

The choice: DVMT Mode.

DVMT/FIXED Memory

When set to DVMT/FIXED Mode, the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.
The choice: 128MB, 256MB, Maximum DVMT.

South Bridge Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
South Bridge Configuration
South Bridge Chipset Configuration
Help Item
USB 2.0 Controller [Enabled]
GbE Controller [Enabled]
GbE1 LAN Boot [Disabled]
GbE1 Wake Up From S5 [Disabled]
GbE2 LAN Boot [Disabled]
HDA Controller [Enabled]
SMBUS Controller [Enabled]
Chassis Intrusion [Disabled]
Restore on AC Power Loss [Power Off]
Options
Enabled
Disabled
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

USB 2.0 Controller (Read Only)

Set to [Enabled] if you need to use any USB 2.0 device in the operating system that does not support or have any USB 2.0 driver installed, such as DOS and SCO Unix.

GbE Controller (Read Only)

This setting Enable the onboard Gigabit Ethernet controller.

GbE1 LAN Boot

When [Enabled], the BIOS attempts to boot from a LAN1 boot image before it attempts to boot from a local storage device.

The choice: Enabled, Disabled.

GbE1 Wake Up From S5

This field specifies whether the system will be awakened from the S5 power saving mode when activity or input signal of onboard LAN1 is detected.

The choice: Enabled, Disabled.

GbE2 LAN Boot

When [Enabled], the BIOS attempts to boot from a LAN2 boot image before it attempts to boot from a local storage device.

The choice: Enabled, Disabled.

HDA Controller

This setting controls the High Definition Audio interface integrated in the Southbridge.

The choice: Enabled, Disabled.

SMBUS Controller

The choice: Enabled, Disabled.

Chassis Intrusion

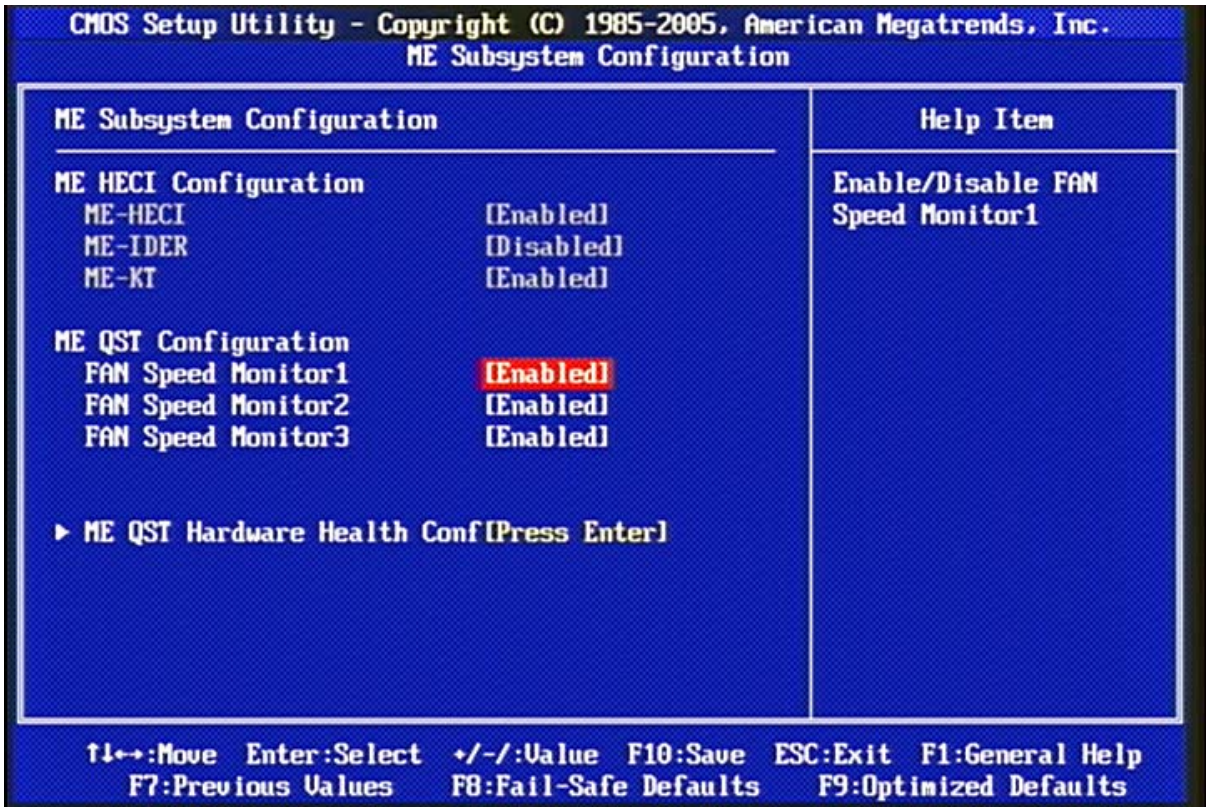
The choice: Disabled, Enabled, Reset.

Restore on AC Power Loss

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

The choice: Power Off, Power On, Last State.

ME Subsystem Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
ME Subsystem Configuration
ME Subsystem Configuration
Help Item
ME HECI Configuration
ME-HECI [Enabled]
ME-IDER [Disabled]
ME-KT [Enabled]
ME QST Configuration
FAN Speed Monitor1 [Enabled]
FAN Speed Monitor2 [Enabled]
FAN Speed Monitor3 [Enabled]
ME QST Hardware Health Conf[Press Enter]
Enable/Disable FAN Speed Monitor1
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

ME HECI Configuration

Enable/Disable ME-HECI, ME-IDER, ME-KT.

ME-HECI (Read Only)

This setting Enable the ME-HECI.

ME-IDER (Read Only)

This setting Enable/Disable can be changed by the IDE-R option of the Intel（R） AMT configuration.

ME-KT (Read Only)

This setting Enable/Disable can be changed by the SOL option of the Intel（R） AMT configuration.

ME QST Configuration

Enable/Disable FAN Speed Monitor1, 2, 3.

FAN Speed Monitor1

The choice: Disabled, Enabled.

FAN Speed Monitor2

The choice: Disabled, Enabled.

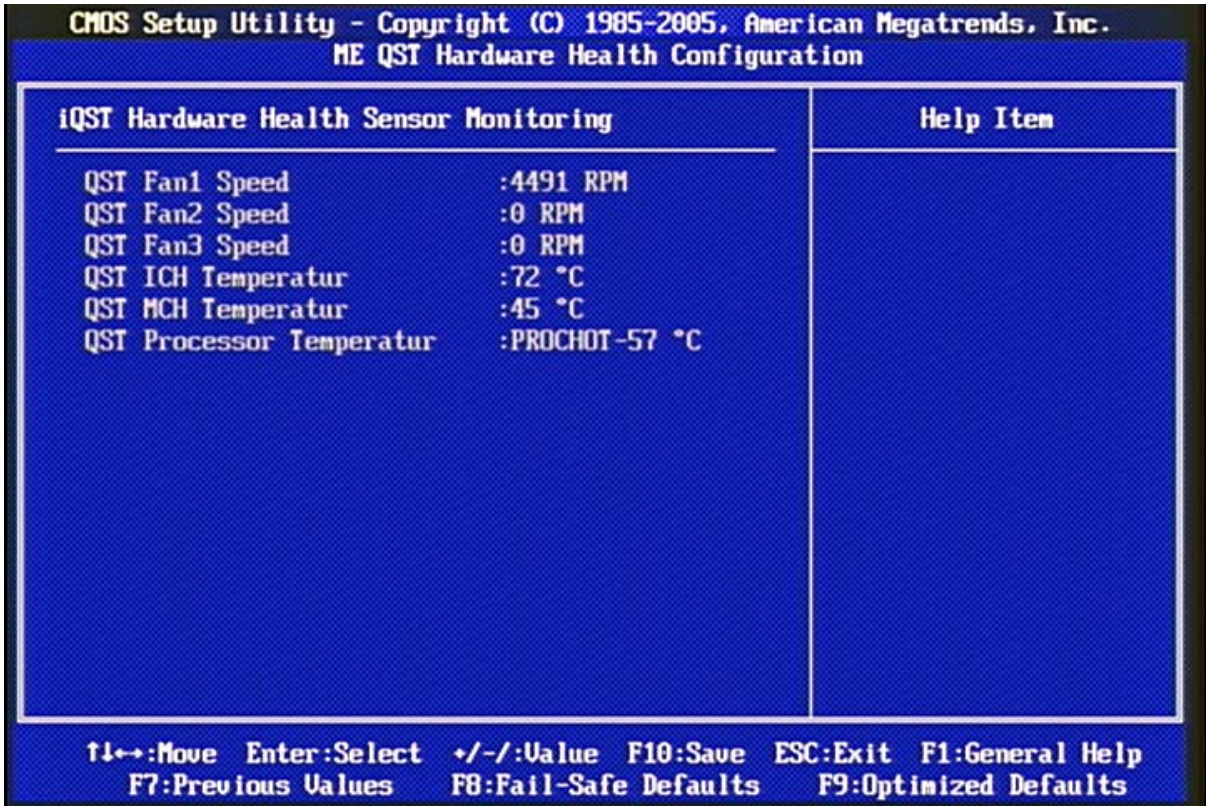
FAN Speed Monitor3

The choice: Disabled, Enabled.

ME QST Hardware Health Configuration

Shows Fan 1-3 Speed, ICH &MCH Temperature and Processor Temperature.

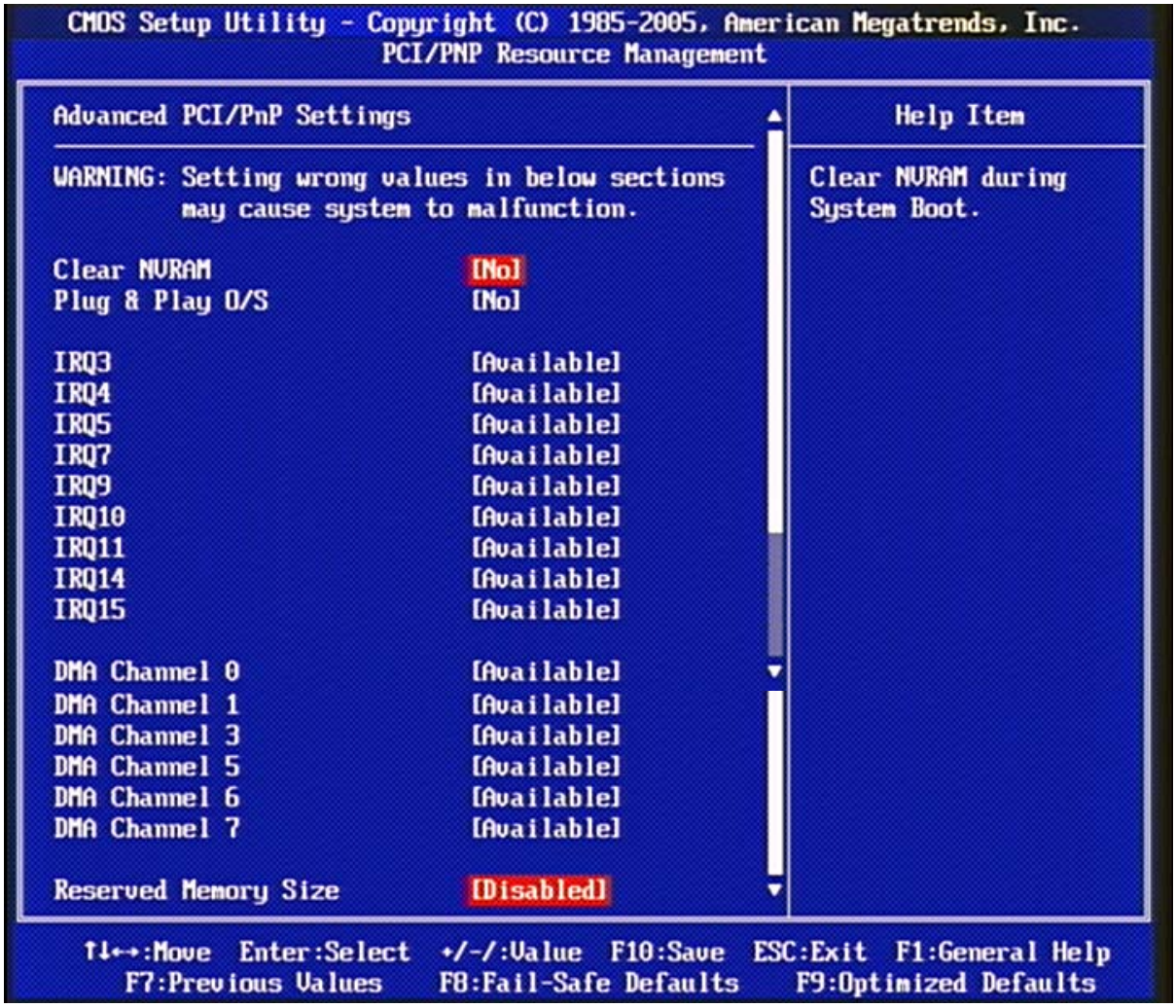
iQST Hardware Health Sensor Monitoring (Read Only)


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
ME QST Hardware Health Configuration
iQST Hardware Health Sensor Monitoring
Help Item
QST Fan1 Speed :4491 RPM
QST Fan2 Speed :0 RPM
QST Fan3 Speed :0 RPM
QST ICH Temperatur :72 °C
QST MCH Temperatur :45 °C
QST Processor Temperatur :PROCHOT-57 °C
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

4.6 PCI/PNP Resource Management

Advanced PCI/PnP setting wrong values in below sections may cause system to malfunction.

Advanced PCI/PnP Settings



Clear NVRAM

Clear NVRAM during System Boot.

The choice: No, Yes.

Plug & Play O/S

No: lets the BIOS configure all the devices in the system.
Yes: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.

The choice: No, Yes.

IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

Available: Specified IRQ is available to be used by PCI/PnP devices.
Reserved: Specified IRQ is reserved for use by Legacy USA Devices.

The choice: Press Enter.
IRQ-3/IRQ-4/IRQ-5/IRQ-7/IRQ-9/IRQ-10/IRQ-11/IRQ-14/IRQ-15 assigned to.

The choice: Available, Reserved.

DMA Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the DMA Resource.

Available: Specified DMA is available to be used by PCI/PnP devices.
Reserved: Specified DMA is reserved for use by Legacy USA Devices.

The choice: Press Enter.
DMA Channel 0/DMA Channel 1/DMA Channel 3/DMA Channel 5/DMA Channel 6/DMA Channel 7 assigned to.

The choice: Available, Reserved.

Reserved Memory Size

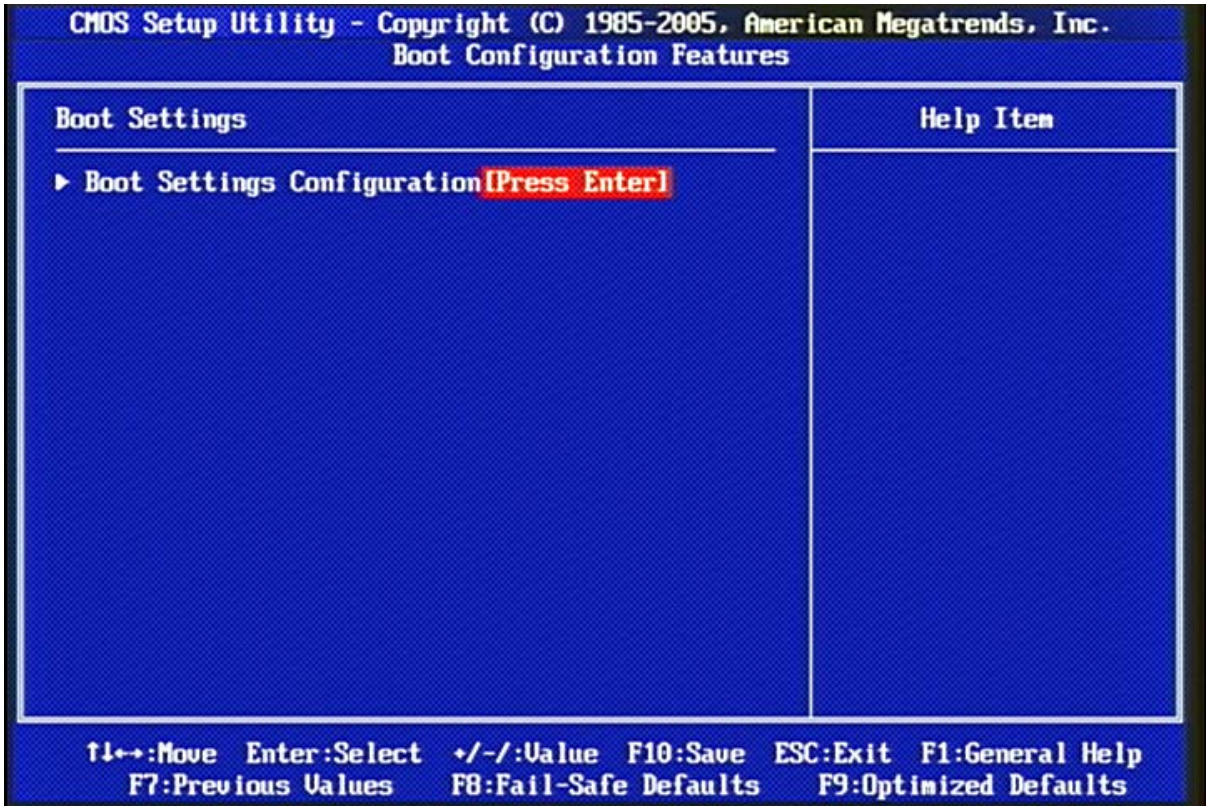
Select Size of memory block to reserve for legacy ISA devices.

The choice: Disabled, 16K, 32K, 64K.

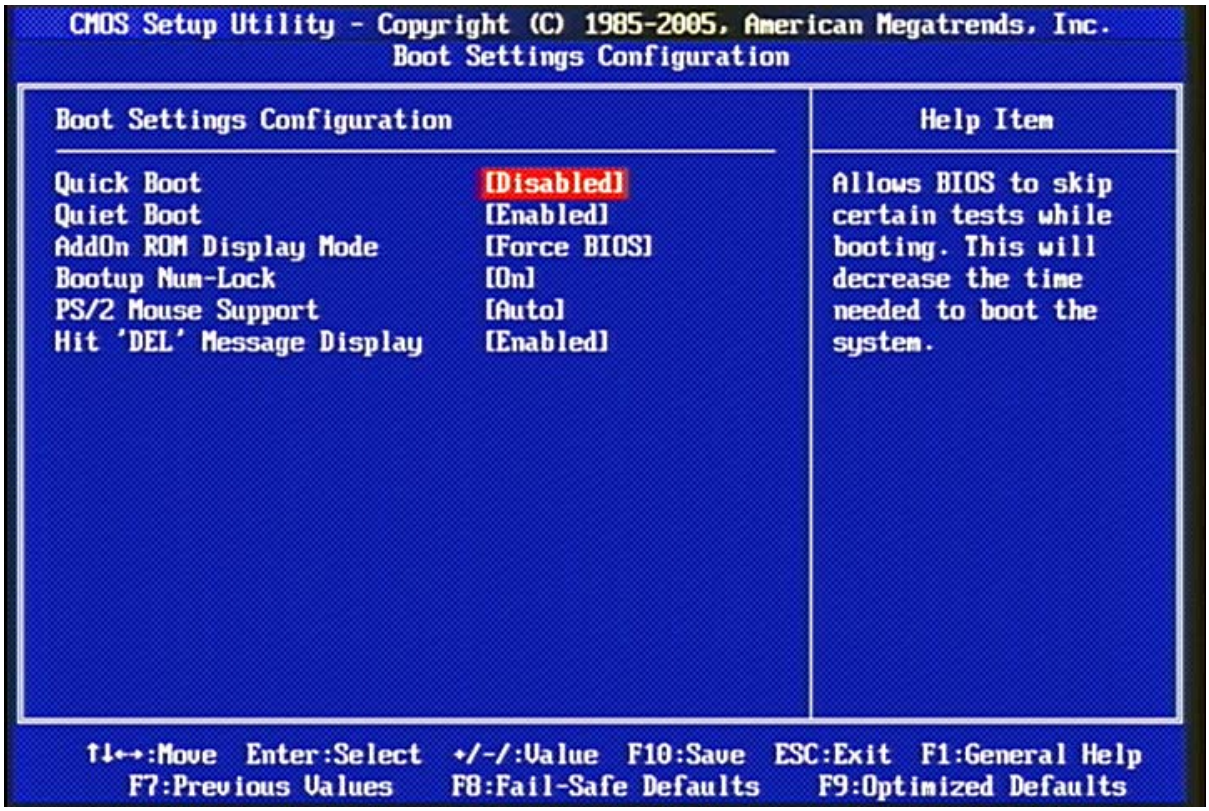
4.7 Boot Configuration Features

Use this menu to specify the priority of boot devices.

Boot Setttings


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Boot Configuration Features
Boot Settings
Help Item
Boot Settings Configuration [Press Enter]
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Boot Setttings Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Boot Settings Configuration
Boot Settings Configuration
Help Item
Quick Boot [Disabled]
Quiet Boot [Enabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
PS/2 Mouse Support [Auto]
Hit 'DEL' Message Display [Enabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Quick Boot

Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

The choice: Disabled, Enabled.

Quiet Boot

Disabled: Displays normal POST messages.
Enabled: Displays OEM Logo instead of POST messages.

The choice: Disabled, Enabled.

AddOn ROM Display Mode

Set display mode for Option ROM.

This item is used to determine the display mode when an optional ROM is initialized during POST. When set to [Force BIOS], the display mode used by AMI BIOS is used. Select [Keep Current] if you want to use the display mode of optional ROM.

The choice: Force BIOS, Keep Current.

Bootup Num-Lock

Select Power-on state for Numlock.

This setting is to set the Num Lock status when the system is powered on.
Setting to [On] will turn on the Num Lock key when the system is powered on.
Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

The choice: Off, On.

PS/2 Mouse support

Select support for PS/2 Mouse.
Select [Enabled] if you need to use a PS/2-interfaced mouse in the operating system.

The choice: Disabled, Enabled, Auto.

Hit 'DEL' Message Display

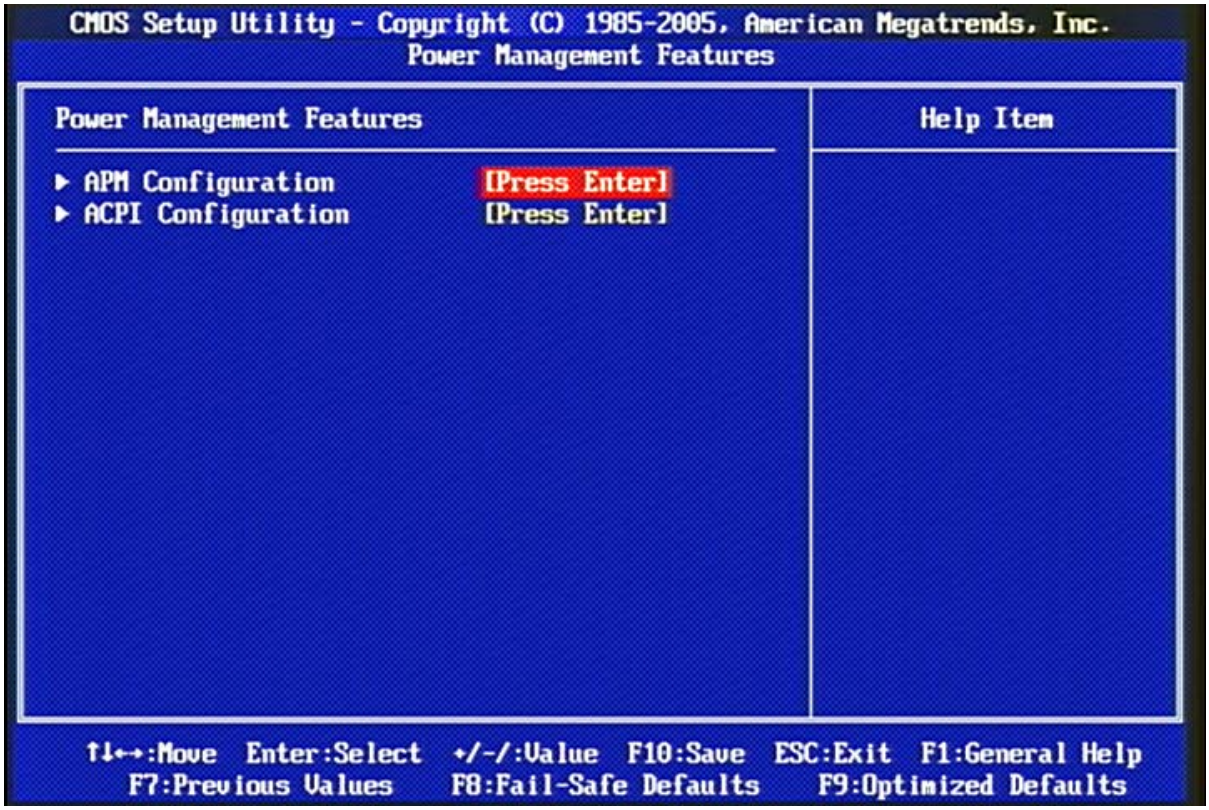
Displays" Press DEL to run Setup in POST".
Set this option to [Disabled] to prevent the message as follows:

Hit Del if you want to run setup

It will prevent the message from appearing on the first BIOS screen when the computer boots. Set it to [Enabled] when you want to run the BIOS Setup Utility.

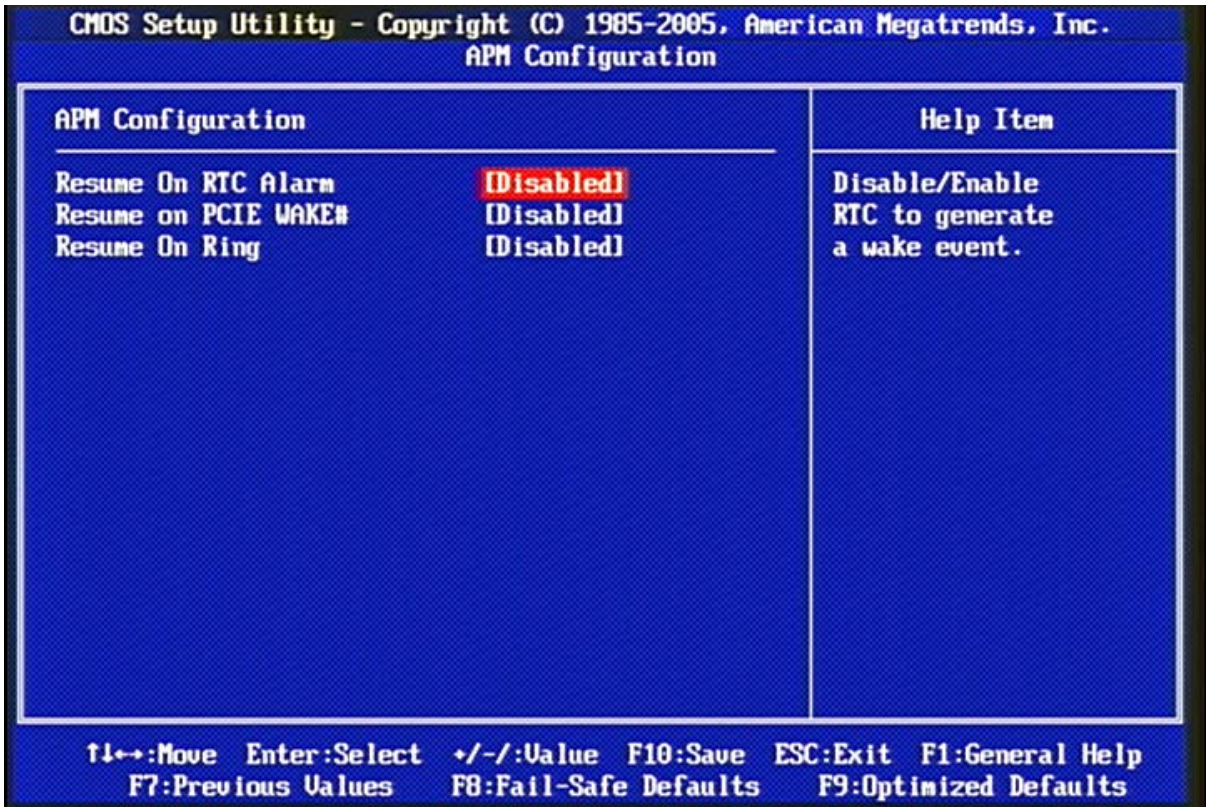
The choice: Disabled, Enabled.

4.8 Power Management Features


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Power Management Features
Power Management Features
Help Item
APM Configuration [Press Enter]
ACPI Configuration [Press Enter]
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

APM Configuration

Select for APM Configuration.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
APM Configuration
APM Configuration
Help Item
Resume On RTC Alarm [Disabled]
Resume on PCIE WAKE# [Disabled]
Resume On Ring [Disabled]
Disable/Enable RTC to generate a wake event.
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Resume On RTC Alarm

Disable/Enable RTC to generate a wake event.

The choice: Disabled, Enabled.

Resume On PCIE WAKE#

Disable/Enable PCIE to generate a wake event.

The choice: Disabled, Enabled.

Resume On Ring

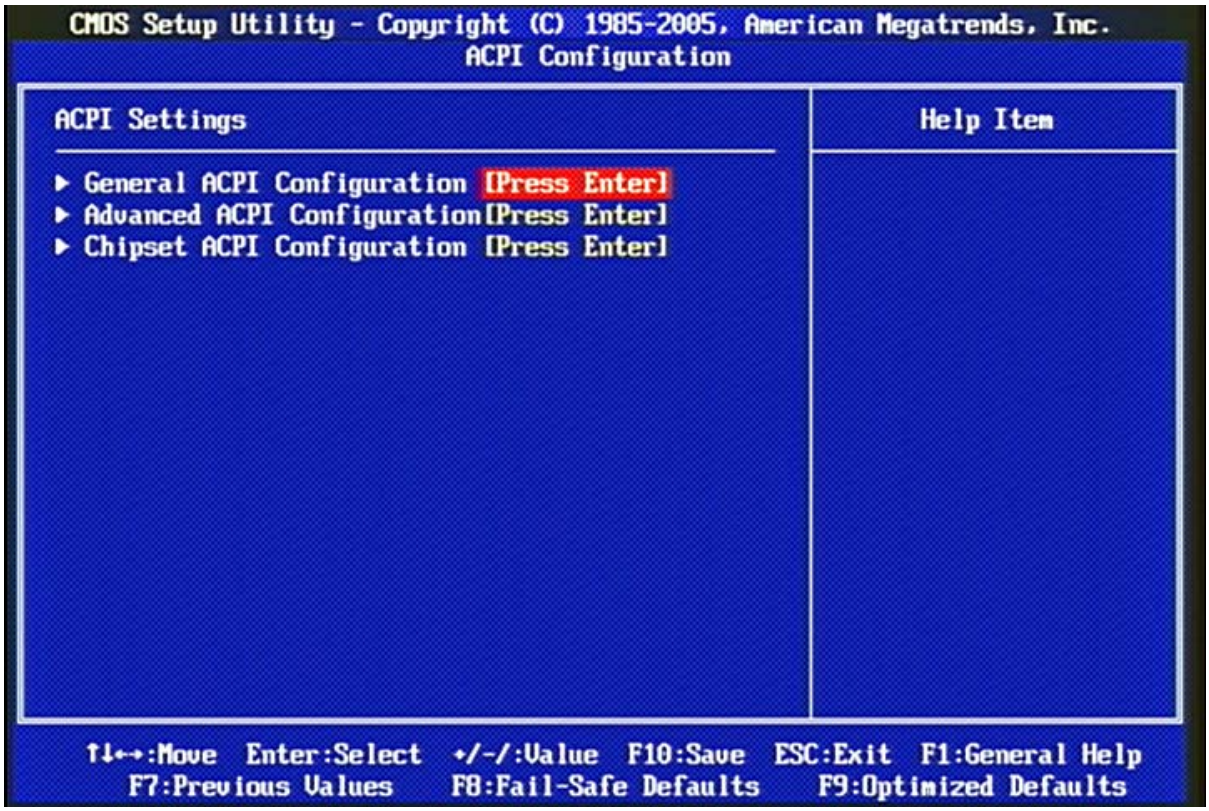
Disable/Enable RI to generate a wake event.

The choice: Disabled, Enabled.

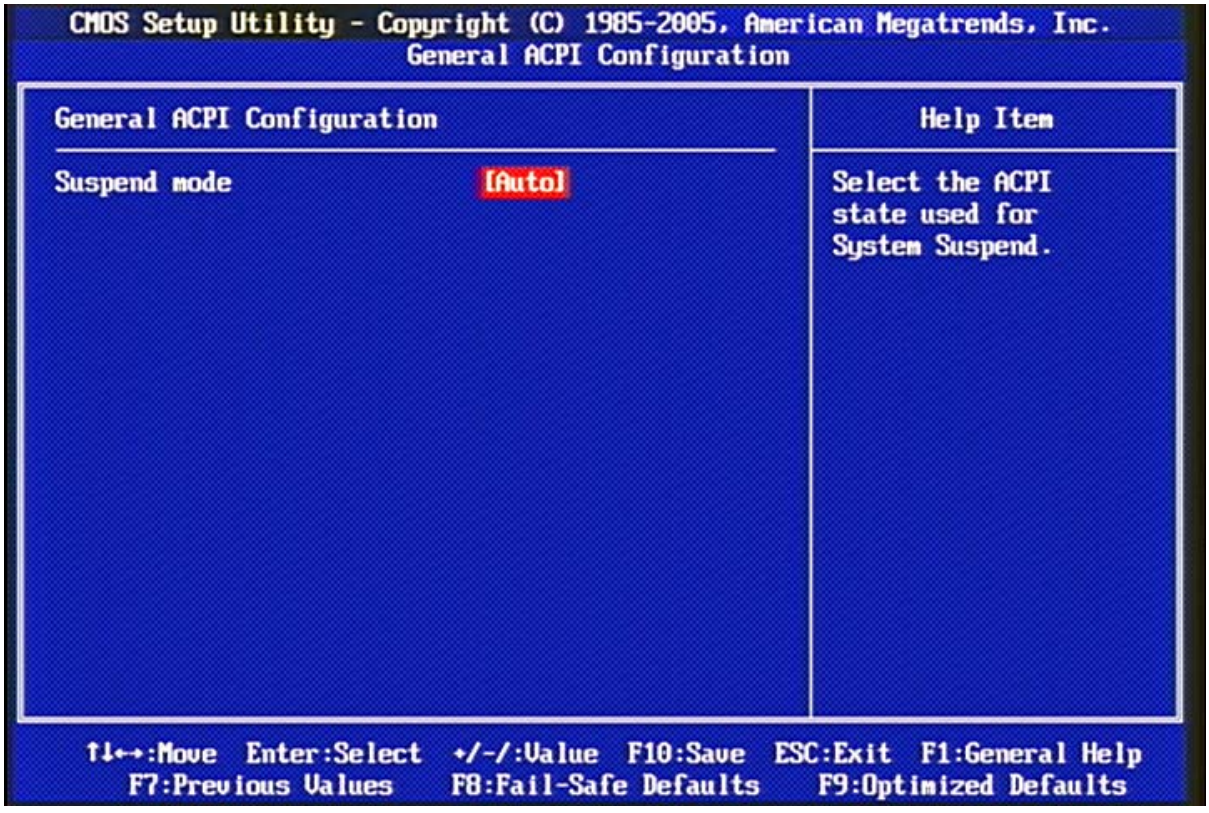
ACPI Configuration

Select for Advanced ACPI Configuration.

ACPI Settings


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
ACPI Configuration
ACPI Settings
Help Item
▶ General ACPI Configuration [Press Enter]
▶ Advanced ACPI Configuration[Press Enter]
▶ Chipset ACPI Configuration [Press Enter]
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

General ACPI Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
General ACPI Configuration
General ACPI Configuration
Help Item
Suspend mode [Auto]
Select the ACPI state used for System Suspend.
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

Suspend mode

Select the ACPI state used for System Suspend.
This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:

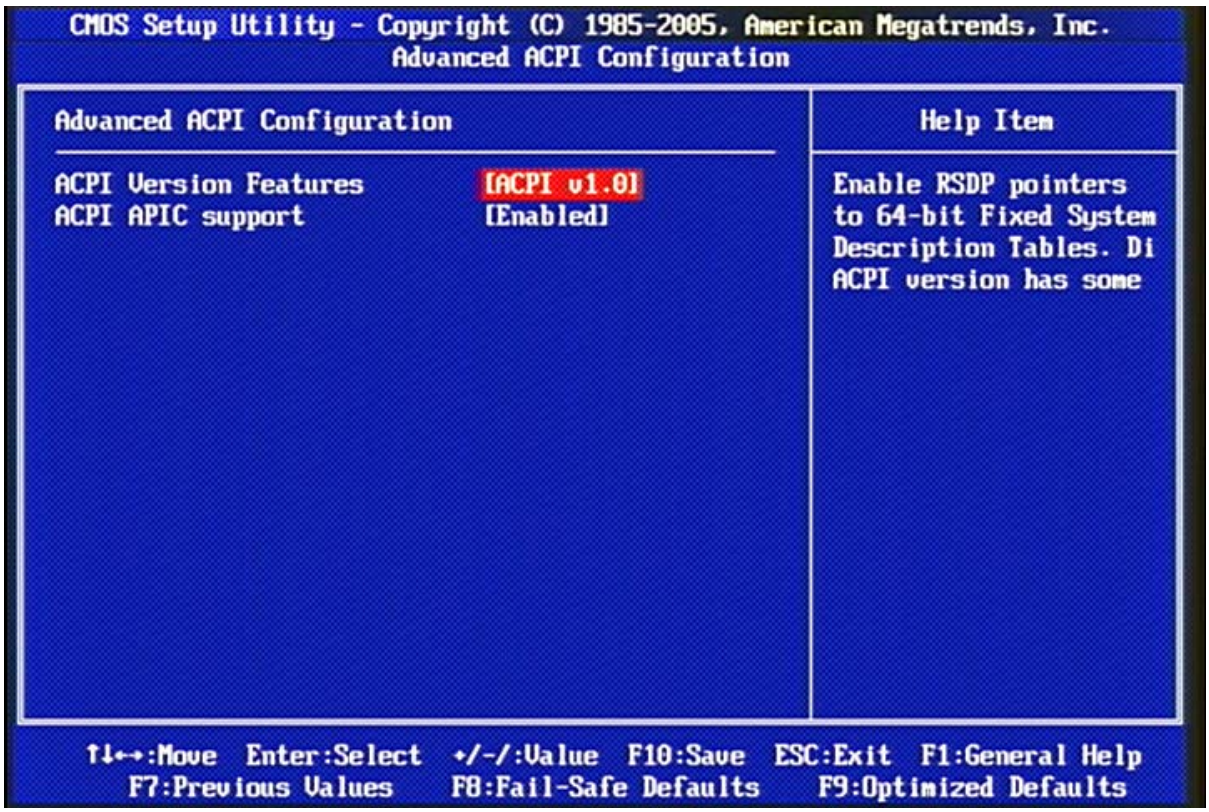
[Auto] The Auto mode provides those S1 and S3 modes to operation system or application and allows them to decide which mode (S1 or S3) can be used.

[S1 (POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system contexts.

[S3 (STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/ files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

Advanced ACPI Configuration

Advanced ACPI Configuration settings, Use this section to configure additional ACPI options.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Advanced ACPI Configuration
Advanced ACPI Configuration
Help Item
ACPI Version Features
[ACPI v1.0]
ACPI APIC support
[Enabled]
Enable RSDP pointers to 64-bit Fixed System Description Tables. Di ACPI version has some
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

ACPI Version Features

Enable RSDP pointers to 64-bit Fixed System Description Tables.

The choice: ACPI v1.0 / ACPI v2.0 / ACPI v3.0.

ACPI APIC support

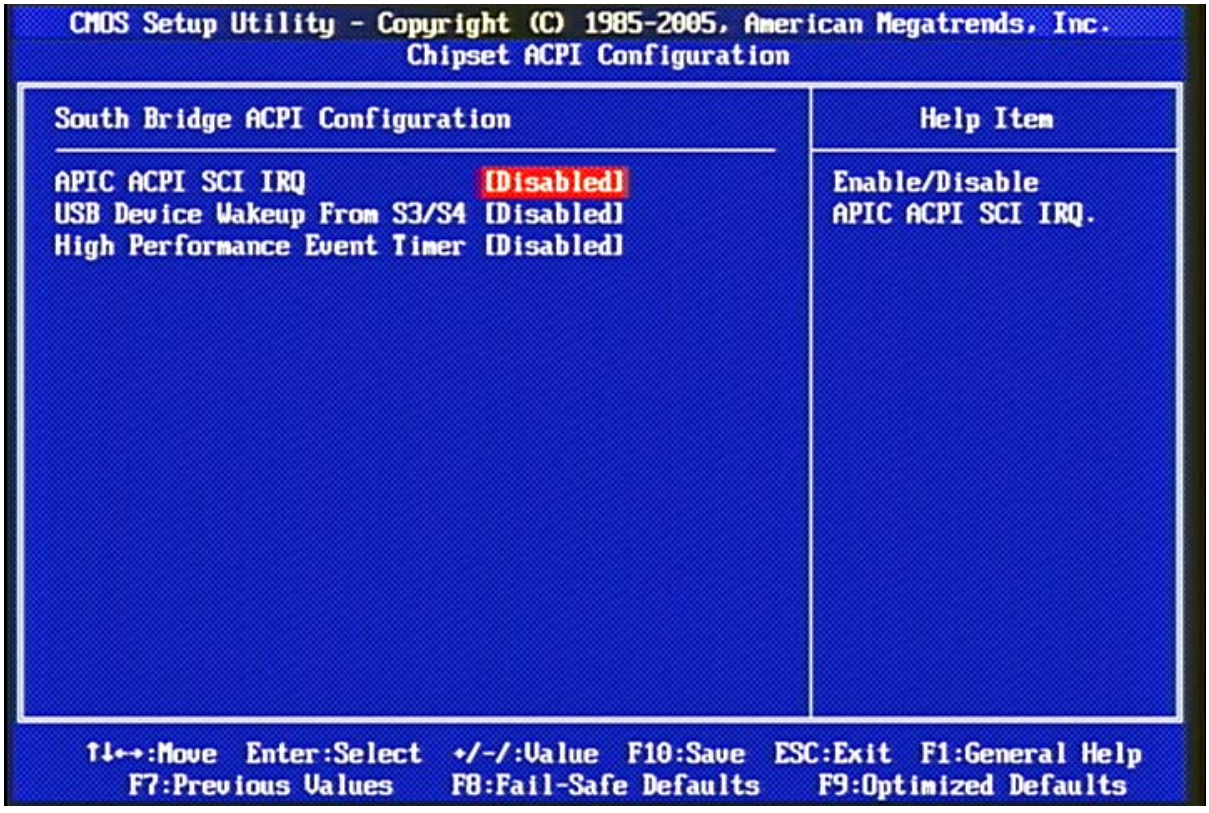
Include ACPI APIC table pointer to RSDT pointer list.

The choice: Disabled, Enabled.

Chipset ACPI Configuration

Chipset ACPI related Configuration settings, Use this section to configure additional ACPI options.

South Bridge ACPI Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Chipset ACPI Configuration
South Bridge ACPI Configuration
Help Item
APIC ACPI SCI IRQ [Disabled]
USB Device Wakeup From S3/S4 [Disabled]
High Performance Event Timer [Disabled]
Enable/Disable
APIC ACPI SCI IRQ.
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

APIC ACPI SCI IRQ

Enable / Disable APIC ACPI SCI IRQ.

The choice: Disabled, Enabled.

USB Device Wake From S3/S4

Enable / Disable USB device Wake from S3/S4.

The choice: Disabled, Enabled.

High Performance Event Timer

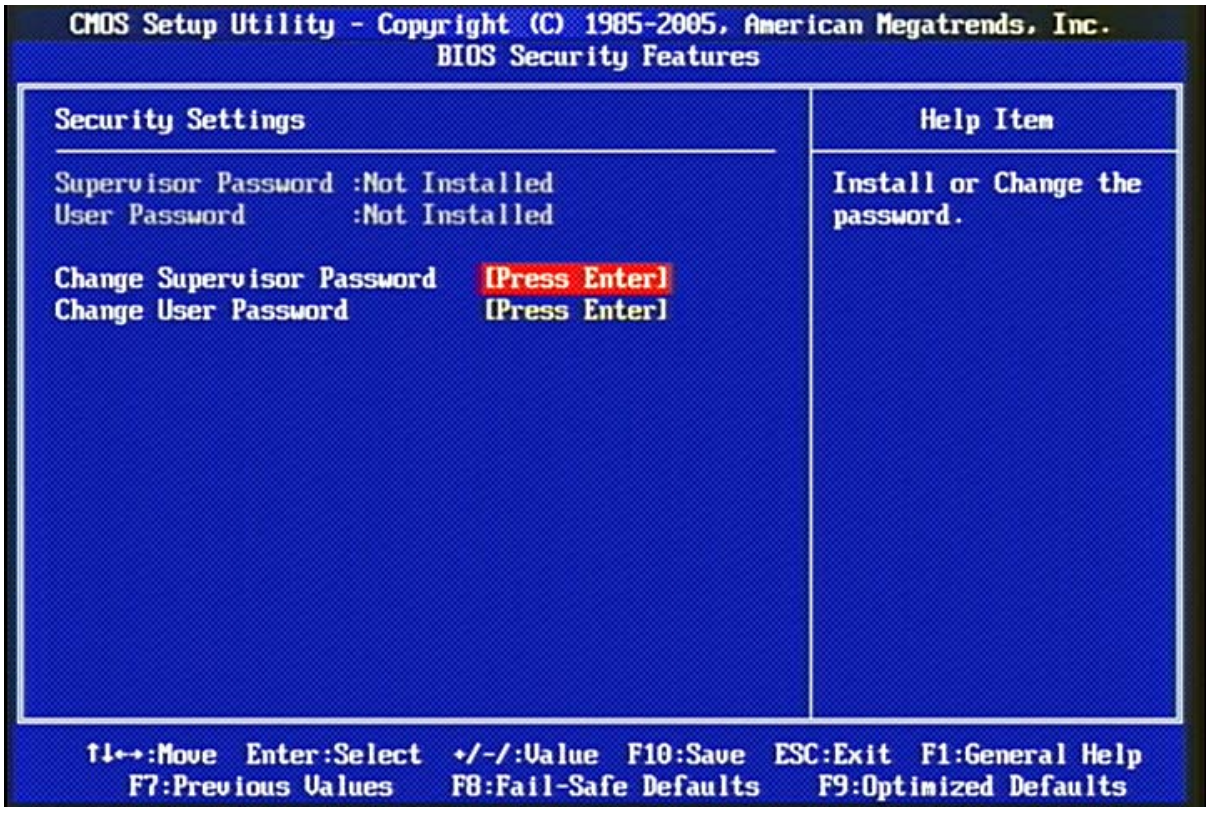
The choice: Disabled, Enabled.

4.9 BIOS Security Features

Use this menu to set supervisor and user passwords.

Security Settings

Install or Change the password.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
BIOS Security Features
Security Settings
Help Item
Supervisor Password :Not Installed
User Password :Not Installed
Install or Change the password.
Change Supervisor Password [Press Enter]
Change User Password [Press Enter]
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults

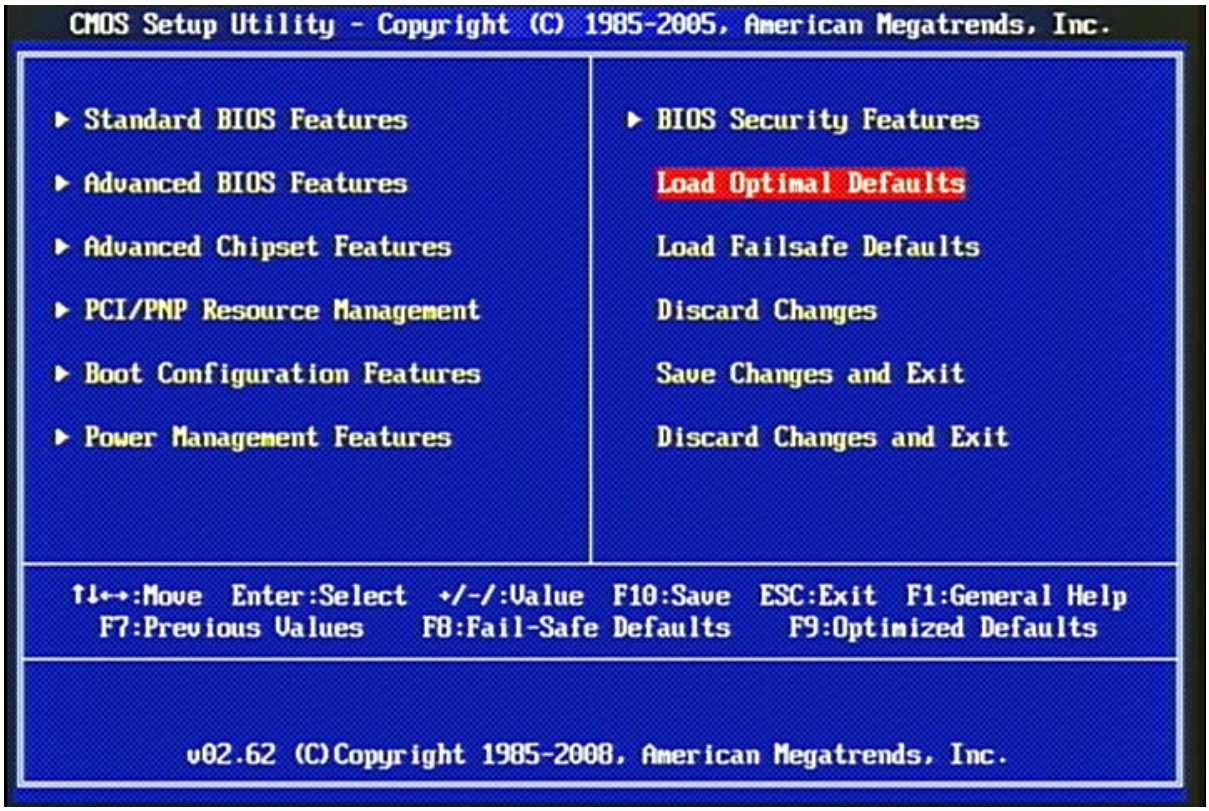
Supervisor Password / Change Supervisor Password

Supervisor Password controls access to the BIOS Setup utility. These settings allow you to set or change the supervisor password. Please press "Enter" to key-in.

User Password / Change User Password

User Password controls access to the system at boot. These settings allow you to set or change the user password.

4.10 Default Menu


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Standard BIOS Features
Advanced BIOS Features
Advanced Chipset Features
PCI/PNP Resource Management
Boot Configuration Features
Power Management Features
BIOS Security Features
Load Optimal Defaults
Load Failsafe Defaults
Discard Changes
Save Changes and Exit
Discard Changes and Exit
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults
v02.62 (C)Copyright 1985-2008, American Megatrends, Inc.

Load Optimal Defaults

When <Enter> is pressed, a confirmation dialog box with a message similar to:

Load Optimal Defaults? [Ok] [Cancel]

Select 'Ok' loads the default values that are factory settings for optimal performance system operations.

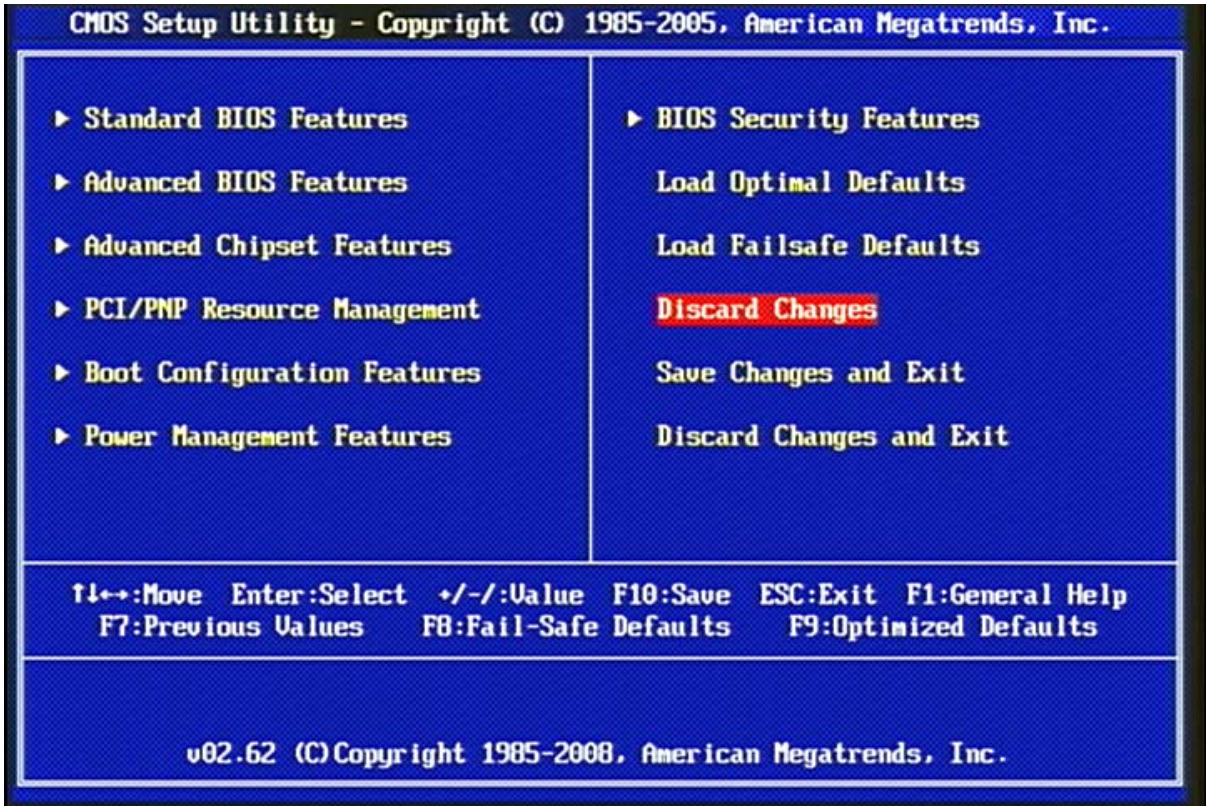
Load Failsafe Defaults

When <Enter> is pressed, a confirmation dialog box with a message similar to:

Load Failsafe Defaults? [Ok] [Cancel]

Select 'Ok' loads the BIOS default values for the most stable, minimal-performance system operations.

4.11 Exiting Selection


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Standard BIOS Features
Advanced BIOS Features
Advanced Chipset Features
PCI/PNP Resource Management
Boot Configuration Features
Power Management Features
BIOS Security Features
Load Optimal Defaults
Load Failsafe Defaults
Discard Changes
Save Changes and Exit
Discard Changes and Exit
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F7:Previous Values F8:Fail-Safe Defaults F9:Optimized Defaults
v02.62 (C)Copyright 1985-2008, American Megatrends, Inc.

Discard Changes

Abandon all changes and continue with the Setup Utility. Pressing <Enter> on this item asks for confirmation: Discard Changes? Please select [Ok] or [Cancel].

Save Changes and Exit

Exit System Setup and save your changes to CMOS. Pressing <Enter> on this item asks for confirmation: Save configuration changes and exit the Setup? Please select [Ok] or [Cancel].

Discard Changes and Exit

Exit System Setup and discard your changes to CMOS. Pressing <Enter> on this item asks for confirmation: Discard changes and exit the setup? Please select [Ok] or [Cancel].

Chapter 5
Troubleshooting

This chapter provides a few useful tips to quickly get RUBY-9911VG2A running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

ATX Power Setting

Unlike other Single board computer, RUBY-9911VG2A supports ATX only. Therefore, there is no other setting that really needs to be set up. However, there are only two connectors that must be connected—PWR2 (24 pins Power Connector) and PWR1.

Serial ATA Hard Disk Setting for IDE/RAID/AHCI

Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total four connectors, SATA1~4 port. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to operate IDE, RAID (0/1) and AHCI application for system, please follow up setting guide in BIOS programming (Table 5-1).

Detect sequence: SATA1 → SATA2 → SATA3 → SATA4
SATA1 -- Primary IDE Master
SATA2 -- Secondary IDE Master
SATA3 -- Primary IDE Slave
SATA4 -- Secondary IDE Slave

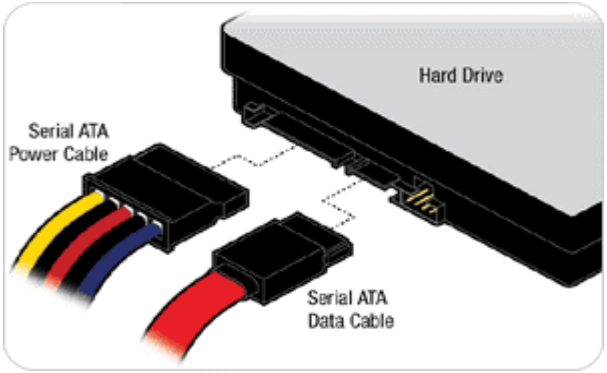


Table. 5-1 SATA Mode setting guide

5.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. CPU, CPU Fan, 240-pin DDR3 SDRAM, keyboard, mouse, floppy drive, SATA hard disk, DVI-I connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with RUBY-9911VG2A, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press "Enter". Setup the selected IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system boots up.

Improper disable operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the COM1/ COM2/COM3/C0M4 ports, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are

Disable COM1 serial port to release IRQ #4
Disable COM2 serial port to release IRQ #3
Disable COM3 serial port to release IRQ #11
Disable COM4 serial port to release IRQ #10

Etc…

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Counter
IRQ #1	Keyboard
IRQ #2	Programmed Controller
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	PCI Bridge
IRQ #6	Floppy Disk Controller
IRQ #7	Ethernet
IRQ #8	CMOS Clock
IRQ #9	ACPI Controller
IRQ #10	Ethernet/USB Controller
IRQ #11	Network Controller
IRQ #12	SMBus, USB 1.0/1.1 UHCI, USB 2.0 EHCI Controller
IRQ #13	PS/2 mouse
IRQ #14	Data Processor
IRQ #15	Primary IDE Controller

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

5.3 FAQ

Installation Problem

Question:I forget my password of system BIOS, what am I supposed to do?

Answer: You can simply short 2-3 pins on JP2 to clean your password.

Note:
Please visit our technical web site at
http://www.portwell.com.tw
For additional technical information, which is not covered in this manual, you can mail to tsd@mail.portwell.com.tw or you can also send mail to our sales, they wull be very delighted to forward them to us.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used.

Memory Area	Size	Device Description
0000-003F	1K	Interrupt Area
0040-004F	0.3K	BIOS Data Area
0050-006F	0.5K	System Data
0070-0E2E	54K	DOS
0E2F-0F6B	5K	Program Area
0F6C-9EFF	574K	Available
= Conventional memory ends at 636K =		
9F00-9FBF	3K	Extended Bios Area
9FC0-9FFF	1K	Unused
A000-AFFF	64K	VGA Graphics
B000-B7FF	32K	Unused
B800-BFFF	32K	VGA Text
C000-CEBF	59K	Video ROM
CEC0- EFFF	133K	Unused
F000-FFFF	64K	System ROM

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

IRQ#	Current Use	Default Use
IRQ 0	System ROM	System Timer
IRQ 1	System ROM	Keyboard Event
IRQ 2	Unassigned	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	Unassigned	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	Unassigned	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	Unassigned	Usable IRQ
IRQ 10	Unassigned	Usable IRQ
IRQ 11	Unassigned	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	Unassigned	Usable IRQ